COAL AGE

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Recently one of our boyhood friends was sentenced to prison for theft. Some days later another friend of our youth was elected president of a great industrial concern. Both had an equal start.

Thus the paths diverge as the years pass. The average man must row hard to even stand still—so strong is the current in life's stream. Any old scow can drift with the tide, and no skill or effort is required to go over the falls which are always nearby.

But when we row hard and straight, still making but little progress, it is naturally disconcerting to hear our friends tell tales of easy trips to some port of success. We say, "How do they do it?" and award ourselves booby prize for being chief of the grand tribe of mortal incompetents.

However, rest easy—smother your envy; the same fellows will be telling like tales next year. You'll find they seldom get into the harbor and never tie up at the dock. Something always slips just as they're going to land. Some day, gentle, forgiving folk will whisper "dreamers," while those less diplomatic will say "liars."

The longer we live, the more we are forced to realize that "getting on" in the world is a full-size man's job Investigators claim that but one man in twenty is even a moderate success in a material way. One per cent. of the population of this country owns nearly fifty per cent. of the nation's Wealth.

Therefore, if a fellow is doing a little better than breaking even, he is of the chosen few. There isn't any real difference between the man who lacks ability to earn more than a living wage, and the fellow who does earn more but saves nothing Both finish at the same tape. The water that has passed is of no further use to the miller. The only market to recognize money already spent is the "land of regrets."

No one has a right to be entirely satisfied. Self-content generally means stagnation. But it's not wise to get wrinkles worrying about the other fellow's success. The chances are, if we could read the secret history of his life, we would find in it enough sorrow and suffering to disarm all our envy. Besides, failure often wears a fur coat, false whiskers and rides in an automobile.

If Bill, or Tom, or John, who used to go to school with you has "got on in the world," don't tell all your neighbors how stupid he was as a boy, and how in the old days you could mine more coal in an hour than he could in a shift, or how you could make twice as many set-ups with your transit.

It's just possible his success is due more to his personality, coupled with a policy of attending strictly to his own business, than to any display of genius. Some men spend so much time minimizing the virtues and ability of others that but little is left to add worthwhile credits to their own record of personal effort.

We may as well seek the end of the rainbow for its bag of gold as expect to add one iota to our personal success by the practice of envy. This passion is only an awkward homage inferiority pays to merit; it corrupts a man's soul as rust corrodes iron. Why send back our mutton and go hungry just because the other fellow is eating venison? Be a booster.

The Atlas Co.'s Plant at Burgettstown, Penn.

By Lee Llewellyn*

SYNOPSIS—This is the second and concluding installment on this plant. The screening and other arrangements for treating and cleaning the coal are described. Particular attention is devoted to the mechanical details and the steel tipple construction is also discussed.

There are two gravity-screen rigs at this plant, each equipped with 3-ton weigh baskets. The rigs are duplicates, except that in one the nut, or nut and slack mixed, passes from the nut-screen chute direct by a spiral chute to one picking table, while in the other the material passes from the nut-screen chute to a shaking pan, which delivers it to the other picking table.

The lump-screen chute is 6 ft. wide by 19 ft. long and provided with 12 ft. of standard bar screen with 1¼-in. spaces for bypassing the screenings around the baskets. Chutes are equipped with extra-heavy fly gates for passing room cleanings to the cross bone-conveyor chute or rock to the rock bin. The screen bars are 2x⅝x$\frac{3}{16}$-in. standard "Akron" bars, supported by 4x¾-in. bearing bars spaced on 24-in. centers. The upper dead plate has a 2-in. buckle at the center of its lower end to assist in distributing the coal evenly to the screen bars. The lower dead plate extends 12 in. beyond the lower end of the screen bars and is notched at upper end and bent down between the bars to raise any lumps that may ride between screen bars. This construction also prevents lumps, riding in this manner, from chipping on the sharp edge of the dead plates, as is the case in ordinary construction. These notches extend far enough beyond screen bars to catch any dust that may ride the bar. The fly gate for bypassing room cleanings and rock is of extra-heavy construction, consisting of two steel plates riveted to a 2-in. square trunnion shaft, which is turned at the ends to accommodate bearing plates attached to screen chute. Gates are counterweighted for easy operation and operated by a lever located near the dump attendant.

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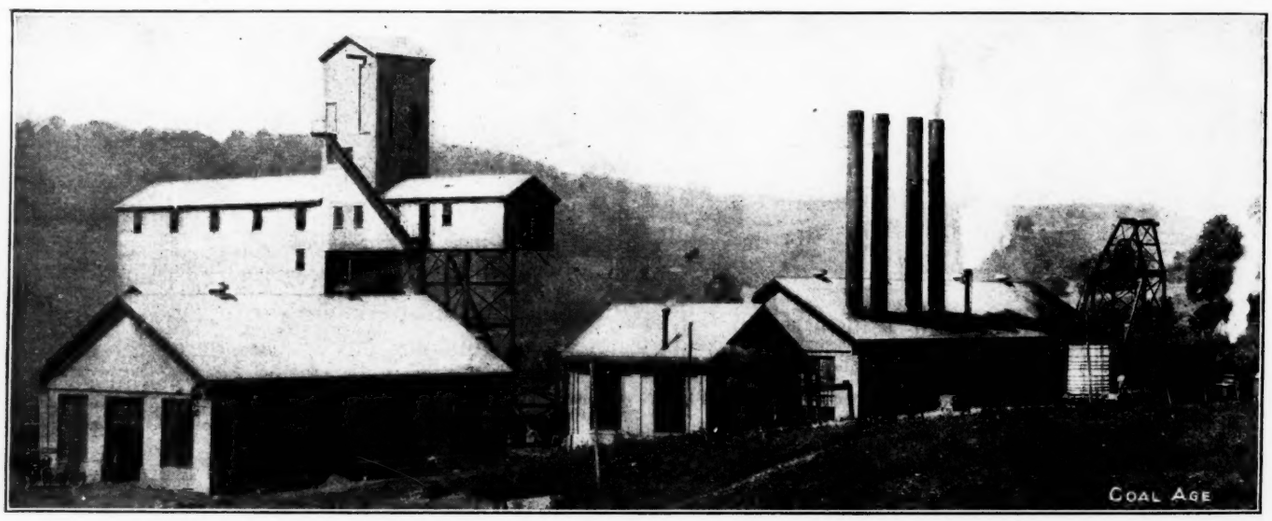
The weigh baskets are hung from structural steel weigh frames and arranged with counterweights for returning them to their normal position after dumping. The operation of the baskets is controlled by the weighmaster through a counterweighted brake wheel connected to a rope and lever system leading to the scale house. The weigh frames are suspended from 10-ton standard tipple scales provided with quick-weighing dials.

Each nut-screen chute is 6 ft. wide by 26 ft. long and provided with 16 ft. of screening surface. Screen bars are 1¾x⅜x$\frac{3}{16}$-in. "Akron" bars, supported by 4x⅝-in. bearing bars, spaced on 24-in. centers. A lower deck is provided for gathering the slack, which is discharged into railroad cars over a chute common to both rigs; this chute



View of Tipple, Showing Hoisting-Engine, Power and Boiler Houses with Man Hoist on the Right

is provided with a section of perforated plate, for taking the real fine dust out of the slack coal. The nut coal passes to a hopper, common to both rigs, and is loaded over a spiral end-loading chute, equipped with a hinged section for low cars. Both the nut- and the slack-loading chutes are equipped with gates operated from the car-trimmer's platform, to stop the flow of coal when shifting the railroad car. Screens are hung by adjustable rods, so that the angle may be varied to suit conditions.

A rock bin, common to both rigs, is provided for receiving rock from either dump. It is of heavy-plate construction and equipped with two substantial steel-plate gates for passing the rock to the dump cars.

Feeders and Picking Tables

There are two plate feeders for feeding the 1¼-in. lump to picking tables. They are of the reciprocating type and consist of a steel-plate chute section hung by forged-steel hangers underneath structural-steel cageways which receive the coal from the feeder hoppers. The reciprocating chutes are beveled at such an angle as to insure an even distribution of coal on the tables. The reciprocating motion is imparted to the chutes from the feeder crankshafts through forged-steel connecting-rods and adjustable crankpins. Feeder crankshafts are driven from the picking-table countershaft through one steel

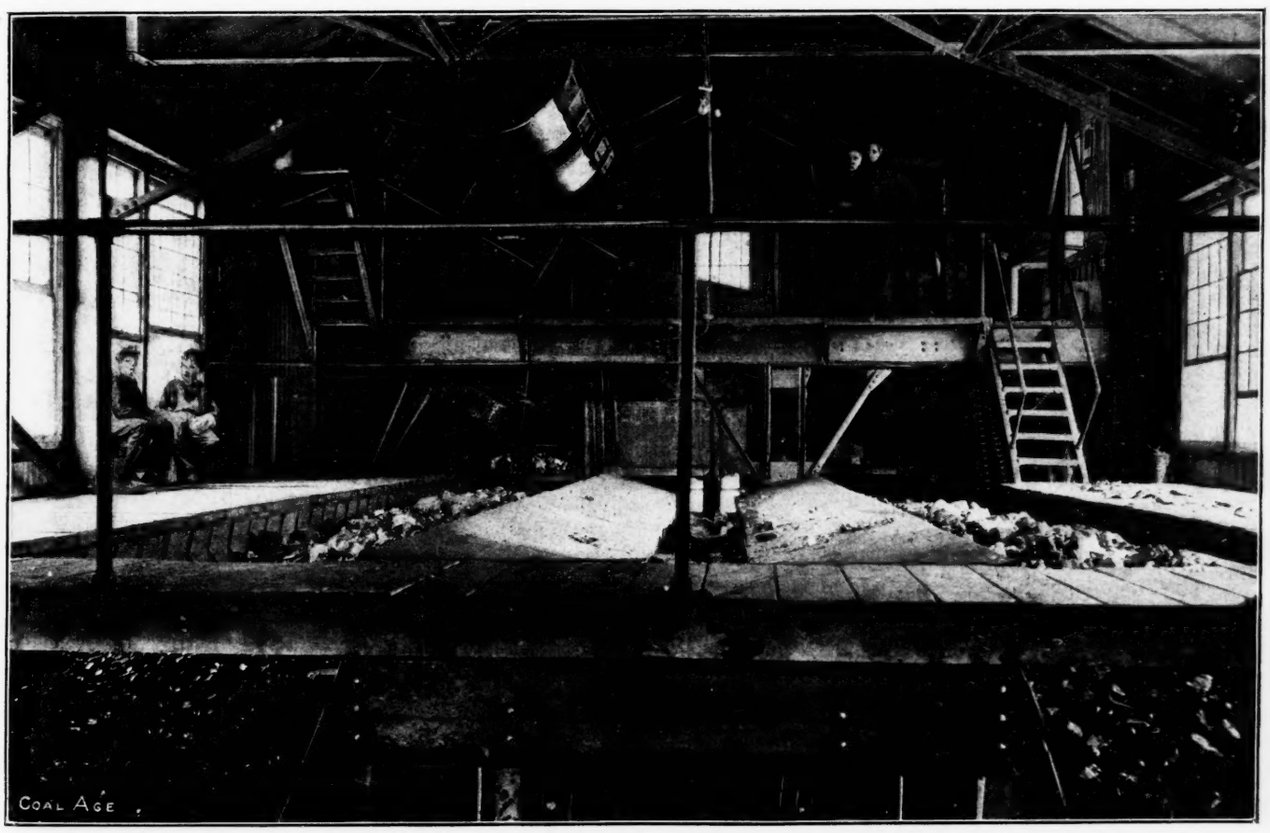
thimble roller and one machine-molded bevel-gear transmission. By this arrangement of drives, when a picking table is stopped its feeder will also immediately stop.

The tables are of duplicate design, and arranged with hinged chute sections for discharging into the cars. They consist of two strands of 12-in. pitch steel thimble-roller chain, to which is attached double-beaded pans 5 ft. long, with moving sides 10 in. high. The tables are arranged for 35 ft. of clear picking space. The speed is 40 ft. per min. and each table is capable of handling 275 tons of run-of-mine per hour, based on the maximum output of 3000 tons per eight-hour day, and assuming 65 per cent. of the output to be ¾-in. lump, the average thickness of lump coal on the tables will be 6 inches.

top of the rail, for topping 8-ft. and 10-ft. cars. Hand winches are used for operating the hinged chutes.

Bone Conveyors, Crushers and Elevator

These conveyors are of the apron type and consist of two strands of 9-in. pitch steel thimble-roller chain, to which is attached double-beaded pans 2 ft. long with moving sides 4 in. high. The conveyor between the picking tables is driven from the picking-table countershaft through one steel thimble roller-chain transmission and the other is driven from the crusher countershaft through one belt and one machine-molded spur-gear transmission. The speed is 40 ft. per min. and capacity 35 tons per hour.



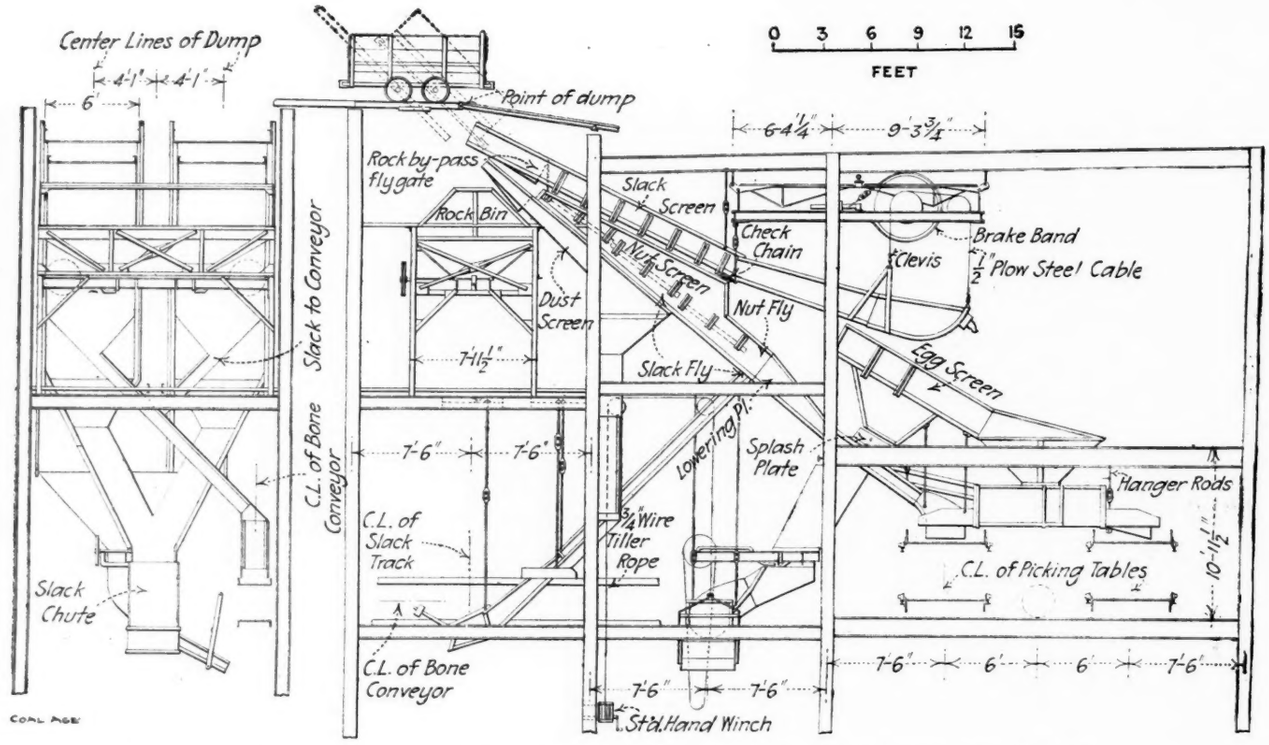
Weigh Baskets, Feeder Hopper, Picking Tables and Bone Conveyor. Note the Excellent Light on the Tables

The drive for the tables is by a 15-hp. motor (which also drives bone conveyor, feeders and shaking pan), through one belt and one cut spur-gear transmission to the line shaft, from which each table is driven by one machine-molded spur gear and one steel thimble roller-drive chain transmission. The driving pinion of each table is fitted with a friction clutch, operated through levers, pipe toggles and bell cranks, from the car-tender's platform.

The tables are mounted on structural-steel frames, supported by the picking-house floor beams, and each is provided with a set of special loading chutes, designed to load and top three different-height cars, viz: 8 ft., 10 ft. and 11 ft. 3 in. high. The first, or stationary chute section, is hung with the discharge point 14 ft. above the top of the rail for topping 11-ft. 3-in. cars. The second and third sections are hinged and hung so the discharge ends will be 10 ft. and 12 ft. high, respectively, above the

The crusher is of the belted, toothed roll type, of extra-heavy design, having rolls 24 in. in diameter by 24 in. long. The rolls are mounted on 3½-in. shafts supported by a cast-iron frame and provided with steel-plate housing. The drive is from a 15-hp. motor by belt to the crusher countershaft, which is mounted on the crusher frame and extended for outboard bearing. One roll is driven from the countershaft by one cut-steel spur-gear transmission and the other by belt transmission, equipped with the counterweighted idler pulley. The belt-driven roll is adjustable and equipped with safety springs to protect the rolls in case injurious foreign material is passed to them.

The elevator is of the perfect discharge type and about 40 ft. center to center of sprockets. It is composed of two strands of 9-in. pitch steel thimble-roller chain, to which are attached 9x12x20-in. buckets every 18-in. cen-



LONGITUDINAL AND END ELEVATION OF TIPPLE WITH DETAILS OF SCREENS AND CHUTES

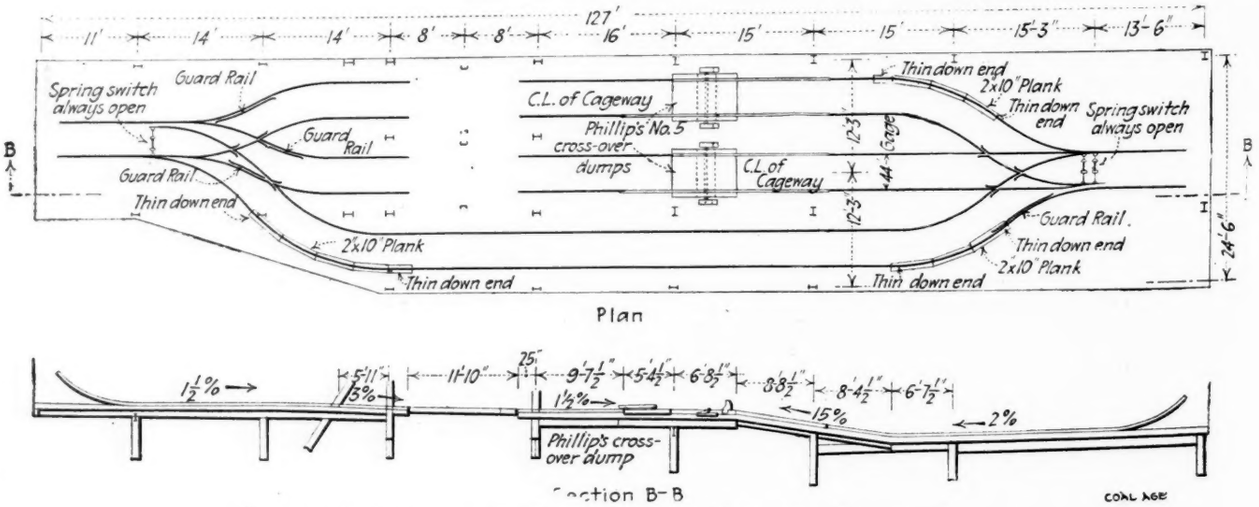
ters. The chain is a duplicate of bone-conveyor chains. The buckets are made of No. 10-gage steel and the digging lips reinforced by 1½x⅜-in. wearing bars. The elevator is provided with a steel boot, casing, hood and steel discharge plates to insure perfect discharge. The elevator is driven from the car-haul countershaft through one machine-molded bevel gear, and one steel thimble roller-chain transmission. The speed is 60 ft. per min. and the capacity 40 tons per hour.

The Boiler-House Car has a capacity of 3½ tons of crushed coal. The hopper portion is built of ¼-in. steel plate, thoroughly stiffened and braced, and supported by a rigid channel-iron frame mounted on four 16-in. heavy cast-iron traction wheels, having chilled treads and 3-in. cold-rolled steel axles. The car is traversed by a General Electric mill-type series-wound motor, having a continuous rating of 3½ hp., through two sets of cut spur gears to the front axle of the car. The motor is controlled by an R-53 reversing controller placed in the operator's cab. Car is provided with a gate and structural-steel chute for passing the coal to the stoker hoppers. The chute is arranged so it can be readily drawn back out of the way when the car is traveling between the boiler house and storage bin.

MISCELLANEOUS DETAILS

Chain Drives—All drive chains for this installation are the steel thimble roller, of one size. Each drive chain is equipped with an idler sprocket to keep the loose side of the chain tight. Special care was taken to have as few sizes of sprockets as possible.

Shafts—All shafting is cold-rolled steel supported in



PLAN AND ELEVATION OF TIPPLE TRACKS, SHOWING GRADES, ETC.

extra-heavy bearings equipped with compression grease cups. No size less than 2½-in. was used, except in gates.

Belts—All drive belts are of the best 5-ply rubber and made continuous for easy running.

Gears are either cut or machine-molded. Gears having a peripheral speed of 200 ft. per min. or over are cut. Pinions having a peripheral speed of 200 ft. or over are forged-steel; all others are cast-steel, machine-molded.

Motors are duplicates, of the General Electric Co. make, type CVC, and wound for 250 volts direct current. The size and units they drive are as follows:

One 15-hp. drives crusher and bone conveyor.
One 15-hp. drives picking-table machinery.
One 15-hp. drives car haul and bone elevator.

The computed horsepower necessary to drive the total equipment is 35.

Steel Work—The columns and batter braces for main headframe and the tipple columns, from foundations to tipple floor, are 10-in. H-sections. The picking-house columns are 10-in. I-beams. The tipple columns above the tipple floor are two 4x3x$\frac{5}{16}$-in. angles placed back to back. The air-hoist columns and batter braces are 8-in. H-sections. The boiler-house car-trestle columns are angle- and plate-supporting I-beam stringers, which themselves support 40-lb. rails for carrying the boiler-house car.

All steel is openhearth, conforming to the Manufacturer's Standard Specifications. All supports and struts are of beam construction. No latticed work was used. The steel framework for the tipple, boiler-house car, trestle and air-hoist headframe was sublet to the Pittsburgh Bridge & Iron Works, of Rochester, Penn., who fabricated and erected same from plans furnished by the Pittsburgh Coal Washer Co.

All roofing and siding is No. 22 corrugated protected asbestos metal. The roofs are laid with 1½ corrugation side lap and 4-in. end lap. Sides have one corrugation side lap and 4-in. end lap. Flashing in No. 24-gage and placed above all windows and doors where they are exposed to the weather.

Stair stringers are built of 8-in. channel irons with angle-iron clips for supporting the treads, which are 2-in. oak planks and bolted to clips on the stringers. All stairways are provided with neat 1¼-in. gas pipe hand rails.

The main tipple floor is 3-in. oak, all other floors, walkways and platforms being 2-in. oak. They are securely spiked to nailing strips bolted to the floor members. All platforms and walkways, where necessary, are protected by a 1¼-in. gas-pipe hand railing.

The main tipple windows are 12 lights, 10x12. The picking-house windows are 24 lights, 10x12. Standard doors are 3x7 ft. Window frames are white-pine mill frames and window sash, white pine. Doors and door frames are of the same material.

Coal in Turkey

Although Turkey produces about 1,000,000 tons of coal and possesses rare unexploited deposits ranging from lignite to anthracite, it imports annually coal to the amount of some $1,500,000, says the Daily Consular and Trade Reports. Most of this coal comes from Great Britain. Of late, certain railroads in Turkey have adopted liquid fuel. There is, nevertheless, an opening afforded in Turkey for American coal, both soft and hard. Negotiations are now being conducted between New York brokers and large commission houses in Constantinople that appear to promise the early introduction into Turkey of American coal as successfully as into Alexandria, Trieste and Genoa.

Illinois' Loss from Biennial Shutdowns

The coal miners of Illinois, according to E. W. Parker, of the U. S. Geological Survey, are probably better organized than those of any other bituminous coal-mining state. The result has been the establishment throughout the coal-mining regions of the 8-hr. day, but the habitual bi-yearly shutdown has naturally resulted in long periods of idleness and loss of income, both to operators and employees.

In 1906, practically all the important mines were shut down, and 49,792 men out of a total of 61,988, were idle for an average of 58 days each. This was equivalent to an average of 48 days of idleness for each of the 61,988 employees, or to 25 per cent. of the total time made.

In 1908, the suspension was not so long nor quite as many men affected, 47,456 out of a total of 68,035 being idle for an average of 37 days, equivalent to an idleness of 26 days for each of the 68,035 employees, or 14 per cent. of the total number of days worked by each man during the year.

In 1910, out of a total of 72,645 men, 67,218 were idle for an average of 136 days, and the total time off was equivalent to 9,133,953 working days. The total time made for the 72,645 men was 11,612,966 days, or an average of 160 days each. Thus, the idle time in 1910 was nearly 80 per cent. of the working time made.

The total number of men employed in 1912 was 78,098, who worked an average of 194 days. Idleness due to strikes or dissensions affected a total of 60,505 men, who lost an average of 33 days. The aggregate idle time due to labor troubles was thus 13 per cent. of the total time worked.

West Virginia Mines Are Flourishing

The last monthly statement of coal shipments over the Norfolk & Western Ry., tells an interesting story concerning the coal mines of West Virginia. For the seven months ending July 31, the total amount of coal and coke shipped was 14,526,695 net tons, as compared with 13,905,052 tons for the corresponding period of last year, or an increase of 4.47 per cent.

The shipments for July aggregated 2,254,601 tons, as compared with 2,096,477 tons for the corresponding month of 1912, which was an increase of 158,124 tons or 7½ per cent. This shows that the increase is growing from month to month. The highest percentage of gain was in coal shipped to Tidewater for export, which increased 33 per cent. in July over the corresponding month of last year, or from 116,339 tons to 155,762 tons.

The coal for export for the first seven months of the year aggregated 1,032,082 tons, an increase of 81,189 tons. Coal shipped to interior points in the seven months increased from 9,994,907 tons in 1912, to 10,318,605 tons in 1913. Representative operators affirm that they could have made a still better showing but for the scarcity of labor.

The Coal Production of Texas

According to the figures of the U. S. Geological Survey the production in coal in Texas in 1912 passed the 2,000,000-ton mark, with a value at the mines of $3,655,744. This is the record production of the state.

The coals of Texas occur in three geological systems, the carboniferous, the cretaceous and the tertiary. The carboniferous coals are bituminous in character, and are found in the north-central part of the state in an area covering approximately 11,000 square miles. The productive portion is confined to the central part of the field. The principal mining operations are in Eastland, Palo Pinto, Erath, Wise and Young Counties.

The cretaceous coals are in the southern part of the state and are mined near Eagle Pass in Maverick County. These are also classed as bituminous coals. Lignite beds of tertiary age extend entirely across the state from the eastern boundary at the Sabine River in a southwesterly direction to the Rio Grande. In the southwestern extremity near Laredo in Webb County the lignite merges into a coal of higher grade, and the production in this region is classed as bituminous.

The development of the lignite resources of Texas began in the last decade of the last century, and the advent of the gas producer in which lignite is found to serve excellently is giving a further impetus to production. The output of this quality of fuel in 1912 reached nearly 1,000,000 tons.

The number of men employed in the coal and lignite mines of Texas in 1912 was 5127, who worked an average of 230 days against 5353 men for an average of 226 days in 1911. The general average production per man was 427 tons for the year and 1.86 tons per day in 1912 against 369 tons and 1.63 tons respectfully in 1911.

There were only two fatal accidents at the coal or lignite mines of Texas last year.

Coal Production in Kansas

The coal production of Kansas in 1912, according to E. W. Parker of the U. S. Geological Survey, working in coöperation with the Geological Survey of Kansas, increased from 6,178,728 short tons valued at $9,472,572 in 1911, to 6,986,182 tons valued at $11,324,130, the gain amounting to 13 per cent. in quantity and 19½ per cent. in value.

The increased production in Kansas, as in the other southwestern states in 1912, may be attributed to the diminished supply of fuel oil and natural gas from the mid-continent field. These fuels, especially oil, have been virtually removed from the steam trade, and steam users have returned to coal.

In 1912, a total of 11,646 men, who worked an average of 202 days, were employed in the coal mines of Kansas, against 11,357 men for an average of 190 days in 1911.

The fatality record in Kansas exhibits the same improvement in 1912 that was evident in most of the coal-mining fields. The number of fatal accidents decreased from 42 to 28, a diminution of exactly one-third.

The coal-productive area of Kansas lies entirely in the eastern part of the state. The coal measures underlie approximately 20,000 square miles, of which about three-fourths may be considered as probably productive.

Over 90 per cent. of the total production of the Kansas mines is derived from Cherokee and Crawford Counties. The principal coal bed in the district, the Cherokee, varies from 3 to 10 ft. in thickness, although the average is only about 3½ ft. The coal is bituminous, of good quality, and roof and floor conditions are excellent.

The Mine Pump

By Berton Braley

(Written expressly for "Coal Age.")

I chug and chug the whole day through
As faithful as I "oughter,"
I always have my work to do
To clear the mine of water.

The mine cars rattle to and fro
In noisest endeavor,
But mine cars come and mine cars go
While I go on forever.

By day and night, by night and day
My valves have throbbed and thudded,
And I must keep right on that way
Lest all the mine be flooded.

The cage may sometimes quit the job
And men can use the ladder,
But if for long I ceased to throb
Few breakdowns could be sadder.

But I am here to stop the flow
With strength that wearies never,
And while the cages come and go,
Still I go on forever.

The miners dig the buried coal
Whatever depth it lurk in,
But I must see the "deep black hole"
Is dry enough to work in.

For if they had to swim I know
'Twould bother their endeavor—
So miners come and miners go
But I go on forever.

I am not "fair to outward view"
I never was a beauty,
My lines of loveliness are few,
I'm built for heavy duty.

I know my humble job, and so
I make my best endeavor,
For men and mules may come and go,
But I go on forever.

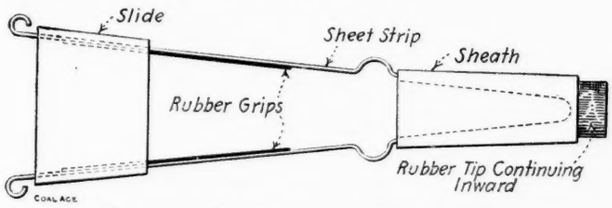
New methods supplement the old,
New tools and new inventions,
New men the reins of power hold,
The mine has new dimensions.

I note how wise the bosses grow
How uptodate and clever,
But men and methods come and go
While I go on forever.

A Pick-Point Protector

Attention has recently been directed in South Wales to a pick-point protector invented by Samuel Griffiths and Edward Thomas, which, although of very simple construction, should have considerable value in preventing the numerous accidents to life and limb arising from the careless handling, carrying and using of the miner's pick.

The apparatus, as shown in the sketch, is made of sheet tin with a rubber lining on the inside so arranged that the rubber grips the part of the pick adjacent to the point. The sliding sleeve is fitted on the two arms in such a way that when this is pushed toward the pick shank it causes the arms to grip the surface of the pick, holding the protector securely in place. To the arms is fitted a head containing a solid piece of rubber against which the pick point is placed.



How the Protector Is Constructed

In order to adjust the protector to the pick, the slide is drawn back, the pick point placed between the two arms touching or almost touching the head of rubber inside the case. The slide is then pushed up and tightened on the pick. Although this device is simple in adjustment, it is claimed that it will not slip when in use, its tendency being to tighten and not to slip. The protector weighs about one ounce and can easily be carried in the vest pocket.

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Shooting off Solid in Illinois

Of the production of 59,885,226 short tons of coal in Illinois in 1912, 26,878,049 tons, or 44.9 per cent., was mined by machine; 7,675,805 tons, or 12.8 per cent., was pick mined, and 24,136,940 tons, or 40.3 per cent., was shot off the solid, according to E. W. Parker of the U. S. Geological Survey. In 1911, 45.6 per cent. of the total Illinois product was machine mined, and 40.3 per cent. was shot off the solid.

These figures show that a comparatively small proportion of Illinois coal is hand mined, and a relatively large amount is "powder mined." This is discreditable and inexcusable.

In this respect, Illinois stands in unfavorable comparison with West Virginia, where less than 1 per cent. of the production in 1912 was shot off the solid. The larger proportion of machine-mined tonnage in 1912 is satisfying, and bears out a prediction that the Illinois coal operators were determined to reduce as much as possible the pernicious practice of making the powder do the work.

The flat-lying character of the Illinois beds is favorable to machine mining, and there appears to be no good reason for permitting solid shooting to continue. The number of mining machines in use increased from 1402 in 1911 to 1654 in 1912.

New Developments in Anthracite Field

The Delaware & Hudson Co. is spending $300,000 on a new breaker at Archbold, the Susquehanna Coal Co. is sinking a shaft at Lykens, the Delaware, Lackawanna & Western Railroad Co. is expending a large sum on the new Loomis colliery, and the Lehigh Valley Coal Co. has appropriated $200,000 to build a new fireproof steel and concrete breaker at Franklin, abandoning the old breaker located there.

In addition to this the Lehigh Valley Coal Co. is spending approximately $200,000 on the thorough fireproofing of its buildings inside and outside the mines, and the Lehigh & Wilkes-Barre Coal Co. is remodeling the Inman breaker at the Buttonwood colliery of the Parrish Coal Co., taken over last February.

The necessity for all this expensive activity is due to the fact that machinery which met all requirements a few years ago is now out-of-date, and has to be supplanted by machinery which is more intricate and costly. There has been a steady increase for several years in the demand for "prepared" sizes of anthracite, and this tendency has brought about a corresponding increase in the cost of handling the coal.

This, however, is not the only factor which has compelled the dismantling of old breakers. Anthracite mining today is carried on in much poorer veins, and at greater depth, than in days past. The richer veins and those nearer the surface have been rapidly exhausted, and the companies are forced to mine coal which once would have been left untouched.

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The Coals of Washington

The coals of Washington, while limited to a few scattered areas, chiefly along the eastern border of Puget Sound, range from anthracite to lignite in character. Lignites are found in the southwestern part of the state, in Cowlitz and Lewis Counties. In Lewis County, as the measures approach the mountains, the lignites grade upward into sub-bituminous and bituminous coal.

The areas along Puget Sound contain sub-bituminous and bituminous coal, some of the latter possessing fair coking qualities, and in the northwestern part of the state, on the slopes of Mt. Baker in Whatcom County, anthracite has been reported.

The coking coals of Washington are the only ones of that grade on the Pacific Coast. They are found in the Wilkeson-Carbonado district in Pierce County; in the North Puget Sound field in Skagit and Whatcom Counties, and in the northern part of the Roslyn field in Kittitas County, but at present coke is made only from the Wilkeson-Carbonado coal.

The production of coal in Washington reached its maximum in 1910, when according to the figures of E. W. Parker, of the U. S. Geological Survey, compiled in cooperation with the Washington State Geological Survey, the output amounted to 3,911,899 short tons. In 1912, the output was 3,360,932 tons. The value fell off from $8,174,170 to $8,042,871.

Reports to the United States Bureau of Mines show that the fatalities in the coal mines of Washington in 1912 were fewer by one-half than in 1911, the total number of men killed in 1912 being 14 against 27 the preceding year.

Coal Shipping on the Great Lakes

SPECIAL CORRESPONDENCE

SYNOPSIS—This installment of the Lake article gives an uptodate estimate of the capacity of the coal docks at the Twin Ports. There are also detail descriptions of two of the largest and mose important installations.

In a recent issue of the *Coal Trade Journal*, we find the following interesting remarks concerning the capacity of the principal dock companies:

THE SUPERIOR-DULUTH DOCKS

According to the latest available figures on dock capacities at the Twin Ports, which are as reasonably accurate as it is possible to make them, the docks at the head of the Lakes, including improvements now under construction, can store ten and a half million tons of bituminous and over a million and a half tons of anthracite, a total of over twelve million tons of fuel. The docks are equipped to handle, on the average, 50 per cent. more than this amount, and with the improved machinery now being installed by several of the more progressive mining companies, it is probable that twenty million tons of coal could be handled each season.

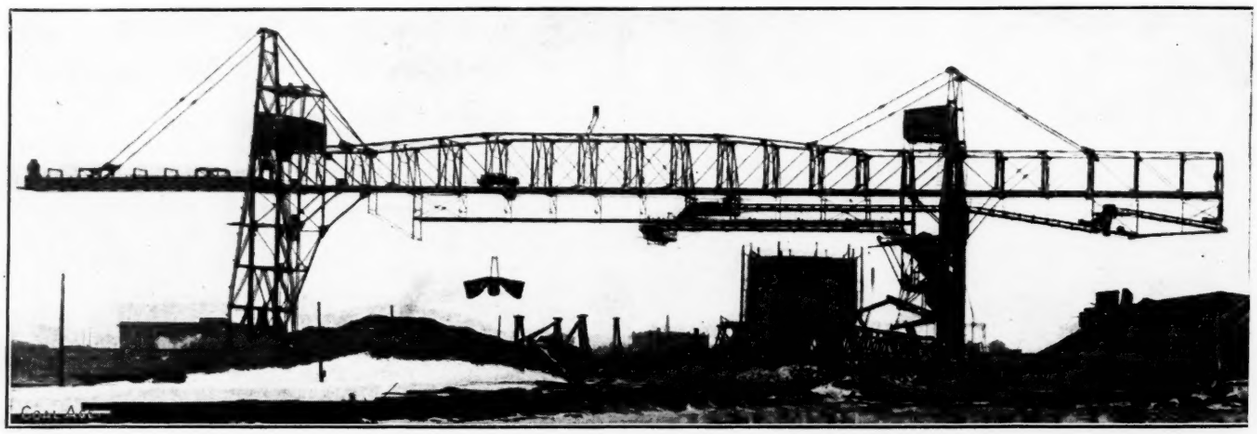
During the past year substantial additions to the total storage capacity of the Twin Ports docks have been made by the Berwind Fuel Co., which now is completing a million-ton dock; the North Western Fuel Co., whose dock No. 1 at Superior is being made into a model structure of its kind; the Pittsburgh Coal Co., which is making better and bigger docks of No. 5 at Superior and No. 7 at Duluth; the Carnegie Fuel Co., which has built a mammoth new dock at Duluth; the Island Creek Coal Dock Co., which is building a million-ton dock at Duluth, and several others which have made minor improvements and additions.

According to estimates made by the various dock superintendents, 200,000 tons of coal could be unloaded at Superior and Duluth daily under maximum working conditions and about half that amount could be loaded onto cars and shipped out. Records of this kind are difficult to compile, however.

For several years the storage capacity of the docks at the Twin Ports has increased at the average rate of a million tons per year and the end is not yet in sight. It is probable that next year several of the dock companies here will make improvements to property on which docks are now located and new structures also are rumored to be under consideration. Men high in the trade here look to see, perhaps shortly after the completion of the new steel plant here in 1915, a storage capacity of 20,000,000 tons of coal at the Head of the Lakes.

STORAGE, RECEIVING, SHIPPING

In the tables accompanying this article the Pittsburgh dock No. 7, at Duluth, includes No. 1, and the new dock, recently completed. Pittsburgh dock No. 2 is leased by the Clarkson Co. The Boston Coal Dock & Wharf Co. dock is given under the name of St. Paul & Western, which now operates the dock. At Superior the Reiss Coal Co. has under lease Pittsburgh docks Nos. 3 and 4, and the Island Creek Coal Co. is operating what was known as Dock No. 6. The old P. & R., or Great Northern dock, is at present occupied by the Great Lakes Co.



GENERAL VIEW OF THE CLARKSON COAL & DOCK CO.'S UNLOADING TANDEM

The capacity figures follow:

Superior

	Storage Capacity Antracite	Storage Capacity Bituminous	Handling Capacity Rec'pts per day	Handling Capacity Shipm'ts per day
Pittsburgh Coal Co. No. 5	250,000	750,000	15,000	8,000
Berwind Fuel Co., No. 1	.....	800,000	10,000	6,000
Carnegie Fuel Co., No. 1	.....	750,000	10,000	4,000
North West. Fuel Co. No. 1	300,000	700,000	20,000	14,000
North West. Fuel Co. No. 2	.....	550,000	9,000	7,000
North West. Fuel Co. No. 3	44,000	64,000	4,000	3,000
Northern Coal & Dock Co.	75,000	125,000	6,000	5,000
M. A. Hanna Dock Co.	60,000	500,000	6,000	4,500
P. & R. C. & I. Co.	200,000	250,000	10,000	5,000
Lehigh Valley Coal Co.	150,000	.....	5,000	2,500
Island Creek Coal Dock Co.	35,000	100,000	3,500	3,000
St. Paul & Western	40,000	200,000	5,000	4,000
Reiss Coal Co. No. 3	30,000	125,000	4,000	3,000
Reiss Coal Co. No. 4	.....	150,000	3,600	2,000
Great Lakes Coal Dock C	75,000	275,000	5,000	3,000
Total	1,259,000	5,339,000	116,000	94,000

Duluth

Pittsburgh Coal Co. No. 7	100,000	900,000	15,000	8,000
Berwind (under cons.)	.....	900,000	10,000	6,000
St. P. & Western (Boston)	40,000	315,000	4,000	3,000
Is. Cr. No. 1 (under cons.)	.....	900,000	10,000	6,000
Carnegie Fuel Co. No. 2	250,000	900,000	10,000	6,000
N. W. Fuel Co.	25,000	35,000	3,500	1,500
Clarkson Coal & Dock Co.	25,000	250,000	5,000	3,000
Zenith Furnace Co.	.....	600,000	4,500	3,500
Duluth M. & N. R.R.	.....	300,000	4,000	3,000
Cutler & Co.	.....	20,000	2,000	1,000
Total	440,000	5,120,000	68,000	41,000

Twin Ports Totals

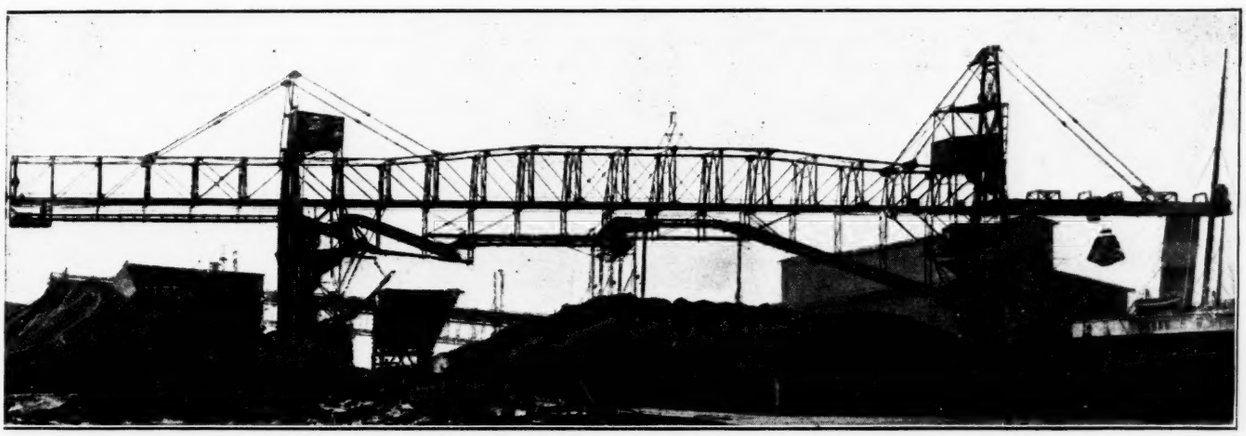
Superior, hard	1,259,000	Superior, soft	5,339,000
Duluth, hard	440,000	Duluth, soft	5,120,000
Total hard	1,699,000	Total soft	10,459,000
Grand total			12,158,000

The Clarkson Coal & Dock Co.'s Plant*

In the early spring of 1912, the Clarkson Coal & Dock Co., of Duluth, realized the necessity for having a more modern coal-handling equipment on their dock in order to take care of their large increase in business. They, therefore, contracted with the Roberts & Schaefer Co. for two bridges of the Watson patent.

The Clarkson dock is approximately 600 ft. wide and 1000 ft. long. It, therefore, became necessary to work the two bridges tandem in order to cover this space. To unload vessels rapidly while depositing coal on the back part of the dock, it was also deemed advisable to use belt conveyors rather than attempt to run the unloading bucket to the back dock. The two bridges were built with identically the same equipment and with the same span, so that the front dock, if later extended in length, could be equipped with the bridge which is now used on the back dock, by merely swinging the bridge on a curved track around to the front dock; it does this under its own power.

Each bridge is equipped with a four-yard Andresen-Evans bucket, operated by means of two 60-hp. Westinghouse mill-type motors. The motors operating the bucket, instead of being carried on the carriage according to the usual method, are on stationary platforms in the towers of the bridges. These motors are geared direct to large cast-steel drums by means of Falk Herringbone gears, which eliminates the noise that usually accompanies the operation of such a high-speed machine.



Bridges, at Duluth, Minn., Constructed by the Roberts & Schaefer Co.

Driving Arrangement, Screening Plant, Etc.

A single ¾-in. cable leads from the drums to the carriage on the bridge. There are two drums on the carriage, one having two sections and the other three sections. The cable from the hoisting drums is attached to one section of each drum on the carriage, while the bucket having three lines is attached to the other three sections of the drums. The holding-line drum on the carriage is equipped with a magnetic brake, and the closing-line drum with a magnetic clutch. The brake is for the purpose of holding the bucket open while the clutch enables the operator to lower his bucket in the open position, both drums revolving together when the clutch is set.

When the coal is being stored on the dock, the bucket on No. 1, or the front dock bridge, runs only from the hatch in the vessel to a hopper in the front leg of the bridge. The coal is then fed from the hopper to a belt conveyor, which deposits it on either the front or back dock, as desired. This is accomplished by means of several fixed trippers and also by means of two shuttle belts, which operate back and forth underneath the fixed belts.

Each bridge is equipped with a complete screening outfit, and coal may be loaded direct from the vessel through the screening equipment of either bridge into cars, or may be reclaimed from the stock pile and loaded out through the screening plants. Each screening plant delivers coal to two tracks, so that cars may be loaded out on four tracks at the same time.

A portable box-car loader is installed in each bridge. These are pivoted to the bridges and swing parallel to, and within the clearance lines, of the bridges, so that they do not act as an obstruction when the bridges are traveling on the dock.

Each bridge has an unloading and screening capacity of 300 tons of coal per hour. The equipment on the Clarkson dock is considered to be one of the most efficient at the head of the lakes.

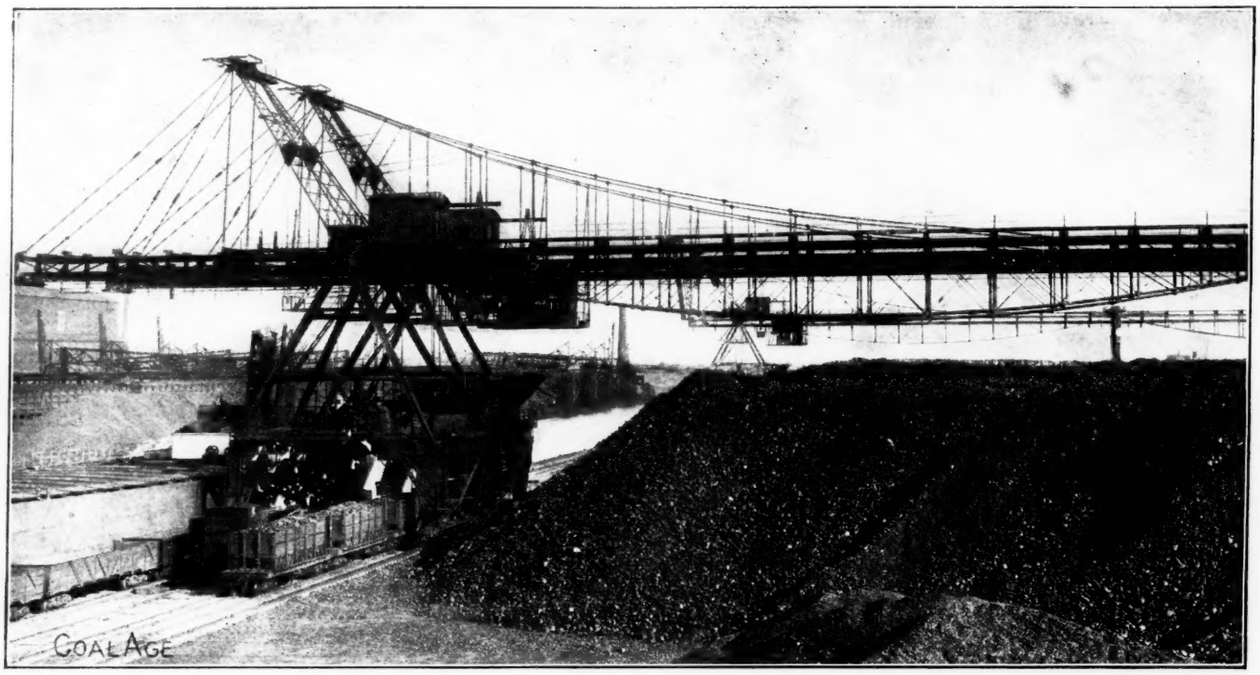
The Pittsburgh Coal, Dock & Wharf Co.'s Allouez No. 5 Dock

The Pittsburgh Coal, Dock & Wharf Co. is equipping one-half of its Allouez No. 5 dock, at Superior, Wis., to be one of the largest coal-dock properties in the world, if not the largest. The half of the dock, now being equipped, will have a storage capacity of about 800,000 tons of bituminous coal and 200,000 tons of anthracite. The entire dock, when completed, will have a total capacity of two million tons. The plant is being carefully laid out with railroad tracks and proper machinery so that large shipments can be easily and rapidly made.

The dock is being equipped with two Brownhoist 5½-ton man trolley bridge tramways, which are being manufactured and erected by the Brown Hoisting Machinery Co., of Cleveland, Ohio.

These two bridges will be identical in size and construction, except that one will have a more elaborate screening apparatus than the other. Each bridge will be supported by a shearleg of A-frame construction, at the front or water end, and a pier at the back end. The bridge will have a span of 342 ft. center to center of the

*By E. E. Barrett, chief engineer, Roberts & Schaefer Co., Chicago, Ill.



UNLOADING DIRECT FROM VESSEL TO RAILROAD CARS ON THE PITTSBURGH COAL CO.'S DOCK NO. 7, AT DULUTH

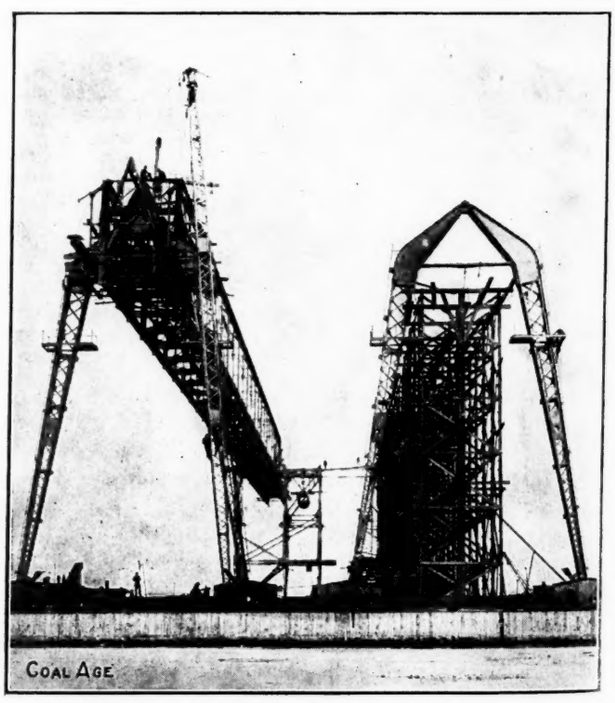
shearleg and the pier. There will be a cantilever at the pier end, 125 ft. 6 in. long, which will span the three railroad tracks and the screening pile. There will also be a cantilever at the water end 117 ft. 9 in. long, which will span three railroad tracks and extend over the water; at the end of this latter will be a hinged apron, which can be raised or lowered to allow the boats to dock. The shearleg and the pier are supported on equalizing trucks with flanged wheels, which travel along the dock on rails. The entire bridge is propelled by a motor, through suitable gearing and shafting.

The bridge, including the cantilevers and the hinged apron, is fitted with tracks on which a man trolley travels back and forth. The trolley is fitted with a cage, in which the operator rides and in which are placed all the switches and controllers for operating the entire bridge. There is suspended from the trolley a Brownhoist coal-grab bucket, of 5½-ton capacity. This bucket has a spread of 17 ft. 8 in., when opened, and is 6½ ft. wide. The bucket is suspended from a turntable on the trolley, thus enabling the operator to turn it through 90 deg., when desired. The operator on the trolley controls the operation of the bucket, the trolley, and also the bridge travel along the dock. The trolley and the bucket are equipped with powerful hand or foot brakes controlled by the operator. The bridge traveling mechanism is supplied with a solenoid brake, which will always be set whenever there is no current passing through the motor.

Each shearleg is equipped with a 50-ton bin, into which the coal is placed by the bucket. Run-of-mine only is loaded into this bin and it is discharged from the bin into a scraper conveyor, which loads it into railroad cars. The shearleg is also fitted with a box-car loader and a car puller.

The pier of Bridge No. 1 is equipped with a 500-ton bin, which receives the coal from the bucket. It is then discharged from the bin onto a shaker screen, located beneath, and passes through a chute onto a pivoted scraper conveyor. This conveyor in turn discharges into the railroad cars. The coal passing through the shaker screen will be discharged into an elevator, which in turn will discharge it onto a belt conveyor, which carries it either to the cars or to the stockpile.

The screening plant located on the pier of Bridge No. 2, is similar to that which is used by the company on their dock No. 7, at Duluth. It consists of a 50-ton receiving bin into which the coal is dumped by the bucket. Below this bin there is a shaker screen, onto which the



TWO NEW BROWNHOIST TRAMWAYS AT THE ALLOUEZ NO. 5 DOCK OF THE P. C. D. & W. CO.

coal is fed from the receiving bin through a power-driven reciprocating gate, which insures a constant discharge.

The coal passing over this screen is discharged into a scraper conveyor, which carries it to the railroad cars; that passing through the shaker screen falls onto an elevator, which carries it up to a rotary screen, where it is sorted into three sizes, stove, nut and screenings. Directly beneath the rotary screen, there is a bin divided into three compartments, one for each grade. Each one of these pockets is provided with a gate, through which the coal flows onto a horizontal belt conveyor, which takes it to the cars or the stockpile. Each compartment is also provided with a second chute for discharging the coal into the small chute at the foot of the shaker screen, to be carried by the scraper conveyor to the cars.

Sometimes the coal is taken from the screening pile and rescreened, being picked up by the bucket and discharged into the receiving bin. This bin is provided with an auxiliary chute, which feeds the screenings into the elevator, where they are discharged into the rotary screen.

The piers on both bridges are also equipped with a box-car loader and a car puller. The operation of the entire plant is as follows:

The coal is unloaded from the boat by the buckets operating on the bridges. Some is then loaded directly into cars, through the bin on the shearleg. If the coal is for storage, it is placed on the large stockpile to await shipment, and if it is to be screened it is carried to the screening plant and then loaded into cars or is put on the screening stockpile. The bridges will also be used for unloading the anthracite and storing it in the hard-coal storage shed. The two bridges and all screening apparatus are electrically operated.

(To be continued)

Grecian Coal Importation

Whereas during 1911 the coal imported into Greece amounted to 639,822 tons says the Daily Consular and Trade Reports, only 476,695 tons were imported in 1912, showing a decrease of nearly 25 per cent. The causes of this decrease was the coal strike of the early summer in England, which country supplies the greater part of the coal consumed in Greece and the strike of the coal workers at Piræus, the port of discharge of most English coal. Another factor was the exclusion of Greek steamers from the Black Sea as a result of the Balkan War. The freight rate from Cardiff to Piræus has advanced from $1.52 to $3.16 per ton, which was the record rate during the Transvaal War.

The decrease in the importation of coal was not confined to Greece, but was general throughout the Balkans and Asiatic Turkey, and is estimated during 1912 as follows: Greece, 163,000 tons; European Turkey, 99,000 tons; Asiatic Turkey, 8000 tons; Roumania, 29,000 tons; Bulgaria, 54,000 tons; total, 353,000 tons.

The coal usually imported is Cardiff mixed with Newport for ordinary bunkering purposes with a few shipments of double screened. The coal used by the gas companies is generally North Country, from Newcastle.

The railway companies imported about 10,000 tons of briquettes from Westphalian coal fields; altogether about 78,000 tons were imported from German coal fields. These shipments included 8000 tons of coke and about 10,000 tons of anthracite. The general shortage of coal throughout the Levant will necessitate the placing of important orders as soon as peace is concluded, and the requirements of these markets will offer opportunity for American coal shippers.

Mexican Rebels Dynamite a Million-Dollar Coal Operation

The Roberts & Schaefer Co., of Chicago, Ill., have received the following communication from one of their clients, a high official of a large coal corporation operating in Northern Mexico:

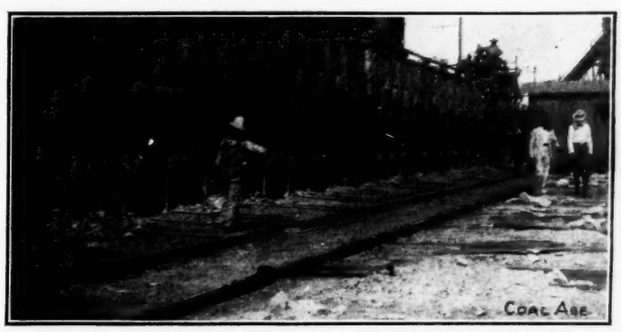
Compania Carbonifera Agujita y Anexas, S. A.
Agujita, Coah., via Sabinas.
Aug. 25, 1913.

Gentlemen:

We beg to advise you that on Aug. 16 our entire plant at Lampacitos was destroyed by the Carranza forces in making their retreat northward from Hermanos, where they were badly defeated by the Federals. The destruction was premeditated, and as soon as word from Hermanos came that the fight there had been lost, it was immediately started.

The Carranza soldiers used dynamite and gasoline, and within two hours they had created a loss of fully one million dollars. The washer was completely destroyed, as was the warehouse with $40,000 worth of supplies. In the power plant the 200-kw., 150-kw., 100-kw. and 30-kw. generating units were first blown to pieces with dynamite, and then the building was burned.

At the mines the tipples were burned, and the fans and fan houses—which were fireproof—were destroyed with dynamite. All of the electric and steam hoists were destroyed



VIEW OF THE RETORT OVENS AT LAMPACITOS, MEX.

with dynamite, and the houses burned. A large number of employees' houses and miners' houses were also burned and the home of the writer was destroyed with all contents.

We have been unable to get down there to estimate the total loss, but from the information gained from the last people to leave the place, there seems little hope of finding much left. The mines will soon fill with water, which will also be a greater loss. Our plant at Agujita has been threatened with similar disaster unless we pay $50,000 for "protection." This we cannot do. They have already taken from there all of our supplies, furniture, etc., and we fear that the property may be destroyed at any moment.

We are writing you in full regarding this matter, with a view of requesting that you give the matter some publicity, if possible. From what we read in the papers, there seems to be considerable feeling in the United States toward extending recognition to the rebel faction, and we would like to have some such things brought out to show what manner of so called "warfare" these people are carrying on. The wanton destruction of a large property that gave a good living to thousands of people, cannot be construed to be of any military advantage or necessity, the Carranzistas having weakly claimed that they destroyed the place in order to prevent the Federals from getting the coal for operating their trains, etc.

The writer would suggest that his name be withheld from any prominence, as he is staying in Mexico at this time looking after the interests at Agujita.

Thanking you for anything that you can do toward this matter, we are,

Yours very truly,
Cia. Carbonifera Agujita y Anexas, S. A.

A Modern Distribution and Storing Plant

By Alfred Gradenwitz*

SYNOPSIS—An efficient electric system designed to accumulate coal coming from the separation plant and intended for local consumption. This plan of transportation not only connects the home sales station with the separation plant, but permits two boiler houses, unfavorably located, to be supplied with coal. The line comprises no less than 27 curves, and is automatic in practically every detail.

Collieries are dependent on a suitable storing plant to make up for any fluctuations in the actual requirements, and to be able to acumulate sufficient stocks for the home sales which are generally crowded into a few hours of the day. Apart from the coal extracted from the mines, that coming from the dressing floors and separation plants has to be stored in separate bunkers.

The electric telpher line of the Deutschland mine, at Schwientochlowitz, Germany, which was designed and constructed by Messrs. Adolf Bleichert & Co., of Leipzig, is intended for accumulating the coal coming from the separation plant, exclusively for home consumption. While it would have been practically impossible with any other mechanical transporting device, to provide for a connection between the separation plant and the home sales station (separated from the former by several buildings), the telpher line here described proved especially advantageous insofar as it allowed at the same time the two boiler houses situated most unfavorably in regard to the separation plant, to be fed with coal. What local difficulties had to be overcome, can be inferred from the fact that this telpher line comprises no less than 27 curves.

*Berlin-Friedenau, Gosslerstrasse 20, Germany.

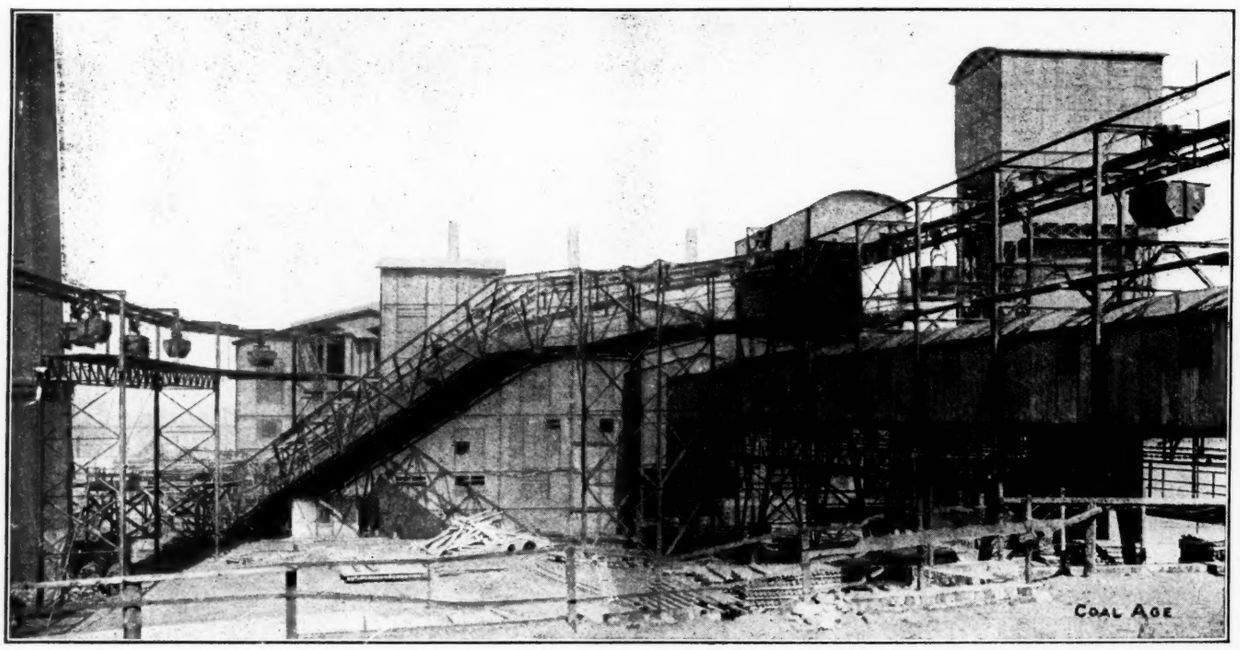


Fig. 1. General View of Electric Telpher Line

Overcoming the Difference in Elevation

The rails below the separation plant, on which the trucks are loaded, are situated about 35 ft. lower than those above the bunkers into which the coal is taken. This level difference has been overcome in a most simple way by a cable-operated inclined lift, according to the "Bleichert" patented design, which has also been used advantageously for the charging of blast furnaces.

The trucks are, at the beginning of the incline, without breaking their journey, uncoupled automatically from the traction cable kept in permanent motion, being raised by it to the upper end of the incline or conveyed downward as the case may be. At the end of the incline, they are again loosened automatically from the cable, continuing their course with electric operation. This arrangement is far more advantageous than a vertical elevator, insofar as it works with absolute safety, and requires no attendance or superintendence. At the same time, the trucks may follow up one another at intervals as short as possible, thus realizing without any difficulty the greatest outputs. In fact, telpher lines for outputs of up to 300 tons have been designed on this system for the charging of blast furnaces.

The distribution of coal to the various loading stations, the boiler-house bunkers and the various compartments of the unloading hopper, separately for each sort of coal, has been solved in a most satisfactory manner. Whereas in the earlier installations a man had to superintend the unloading, adjusting the stops intended to tip the trucks, Messrs. Bleicherts' adjusdting mechanism allows the operator already in the separation plant to fix the point at which the truck is to be tipped.

This is important because quite a number of different

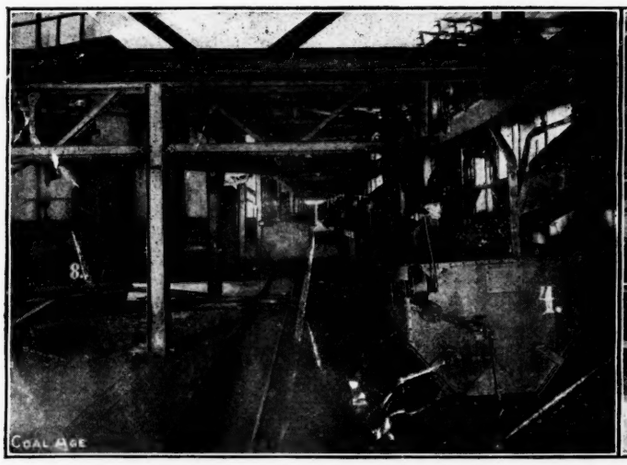


FIG. 2. LOADING WITH DIFFERENT GRADES OF COAL

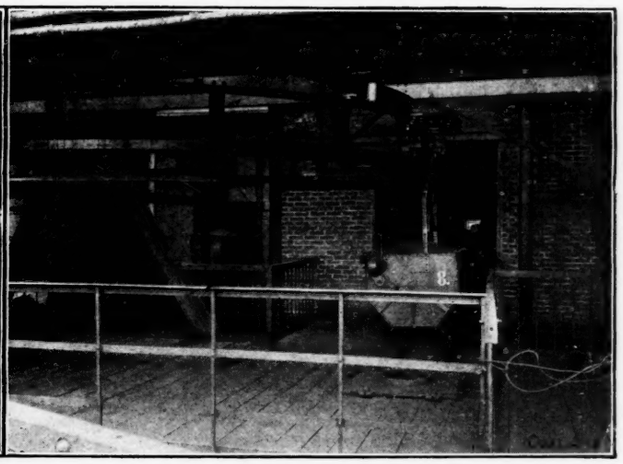


FIG. 3. LOADED TRUCK LEAVING SEPARATOR PLANT

sorts of coal have to be transported at a time, which would require a permanent adjusting at the loading station, giving rise to mistakes on account of the irregular sequence of trucks. In the Deutschland mine installation, such mistakes are practically precluded, the trucks being properly adjusted in advance.

METHOD OF OPERATION

The operation of the telpher line may be described briefly as follows: The empty trucks entering the separation plant are kept back by the block system and arranged at given distances apart, in the event of the places in front of the loading chutes being taken up. After the starting of the loaded trucks, they move on automatically, stopping in front of the bunkers, where the operator, by opening a trap, loads the truck with the desired sort of coal (Fig. 2).

By operating a switch, he then starts the filled trucks, causing these to travel through the whole line, inclusive of the inclined lift and the unloading stations, at a speed automatically controlled, and at a distance apart corresponding to the block-system, tipping at the points adjusted for by the locking frame, without breaking their journey.

The issue from the separation plant, where the trucks deviate in a sharp curve toward the inclined lifts, is shown in Fig. 3, the inclined lift with part of the track traversing the court yard at 48 ft. height being visible in Fig. 1. In the left-hand part of the latter figure, there happens to be visible a section of the Bethlen-Falva Iron Works' telpher line, which is one of the oldest installations of the kind, having been in satisfactory operation since 1905, in spite of exacting working conditions. It may be said, in passing, that the Bethlen-Falva Iron Works in the meantime have had installed another electric telpher line on the same system for the conveying of hot ingots, for their fine-iron rolling mill.

Fig. 4 shows the upper part of the inclined lift with a filled truck just uncoupled, and an empty truck seizing the continually moving traction cable and being conveyed downward.

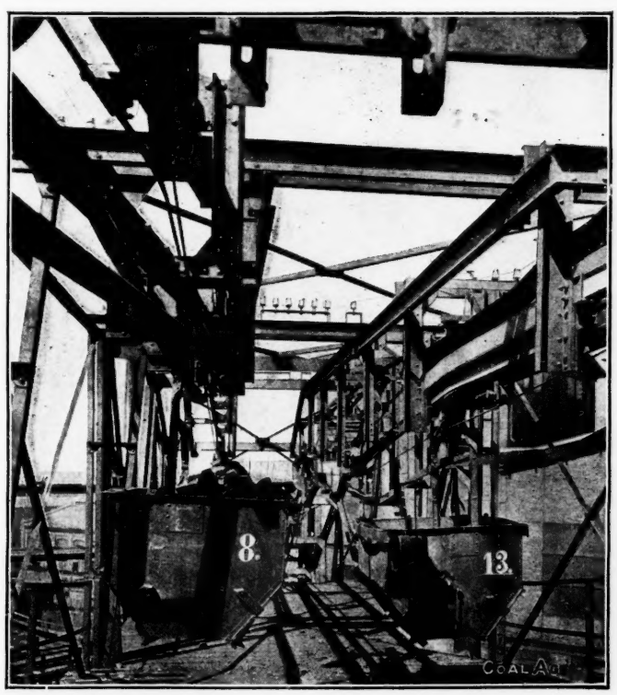


FIG. 4. UPPER SECTION OF TRAMWAY

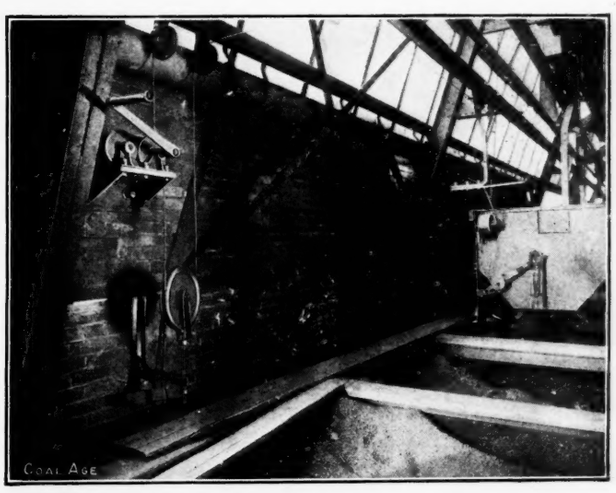


FIG. 5. AUTOMATIC DISCHARGE AT BOILER HOUSE

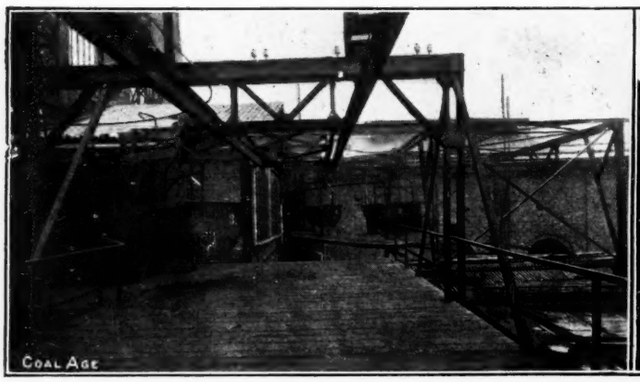


FIG. 6. INSTALLATION AT OLD BOILER HOUSE

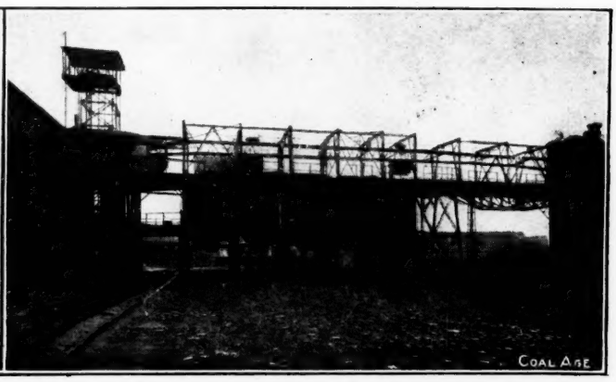


FIG. 7. LOADING HOPPERS FOR HOME SALES

COURSE OF TRAVEL FOR LOADED TRUCKS

The trucks then travel through boiler house I, the home sales bunker and boiler-house II, the tipping, in accordance with the above plan of travel, being effected at predetermined points. In order that the stoker may be in a position accurately to adjust for the point of the boiler-house bunker where unloading is to take place, the stops in the boiler houses, as inferred from Fig. 5, have been made adjustable by means of the small hand-operated winch visible to the left in the foreground, from which an endless traction cable is seen to connect with the stop. A tightening pulley has been provided to keep the cable taut.

Fig. 6 shows the point in front of the old boiler house where several sections of the line are seen closely crowded together. Truck No. 2, coming from the new boiler house, is returning empty to the separation plant; truck 8 is entering the old boiler house filled, and truck 3 is just on its way to the home sales station, after passing the old boiler house. Fig. 7 is a front view of the loading hoppers for the home sales station, which are encompassed on one side by the pit building and the old boiler house, and on the other, by the new boiler house.

Fourteen trucks, each of 1764 lb. useful capacity, travel on the line, which arrangement permits the handling of 50 tons of coal per hour. The telpher line is about 2600 ft. in total length.

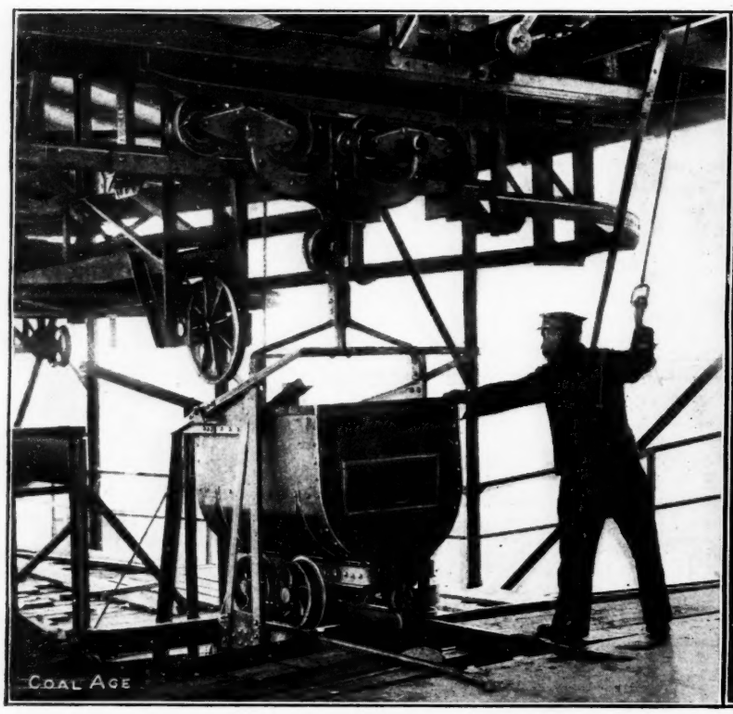


FIG. 8. TRANSFER TABLE FOR MINE CARS

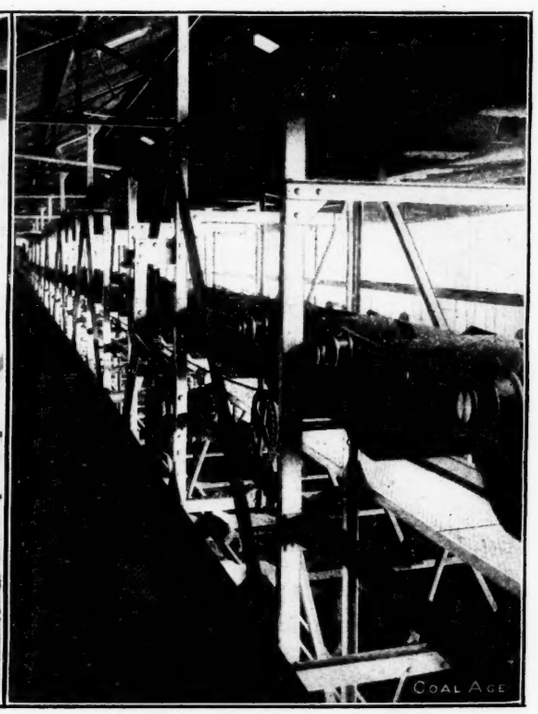


FIG. 9. CONVEYOR LINE IN CENTRAL STATION

The Deutschland mine plant is a typical instance of the ease with which telpher lines on this system allow the most complicated problems to be solved in a simple and economical manner.

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Gas should not be allowed to explode in a safety lamp if it can possibly be avoided. When examining to detect gas the lamp should not be raised higher than will allow the gas to be detected. If the gauze of a safety lamp becomes damaged while in use or if oil is spilled on the same or the chimney becomes cracked, the light should be extinguished at once and the lamp taken back to the light station for examination and repairs.

The United States vs. the Reading Co.

By A. T. Shurick

SYNOPSIS—A review of the latest attack on the hard-coal combine. For the first time the powerful Reading Co. has been put on the defensive. Government's case appears to be well established, but there is much diversity of opinion as to the outcome.

The partially successful governmental attack on the alleged anthracite trust, which resulted in the dissolution of the Temple Iron Co. and the abolition of certain other conditions, toward the close of last year, appears to have been but the preface of a determined effort to effect a complete disintegration of this combination. While this previous case nominally resulted in the defeat of the operators, it was generally conceded that the results were inconclusive, indeterminate and without any real material effect. But although the court ruled that the government had failed to prove its case in the more vital points at issue, it nevertheless dismissed these "without prejudice."

It cannot, therefore, be considered that Attorney-General McReynolds' renewal of the attack in any way resembles the taking up of a "lost cause." As a matter of fact, all indications point to the contrary. Mr. McReynolds is a serious and determined man and is, no doubt, thoroughly imbued with the righteousness of his case and absolutely sincere in his work. He has been engaged for years, under both the Roosevelt and Taft administrations, in carrying on proceedings against the anthracite companies and he knows the ground thoroughly. His great experience and past defeats have only served to make him a more formidable antagonist.

The Charges against the Reading

The new bill of complaint against the Reading first reviews the organization of the company and its various subsidiaries, together with their present relations. This is followed by a study of the ownership of the remaining available anthracite resources, regarding which the following statement is made:

> This combination is the backbone of the alleged monopoly of anthracite. It controls about two-thirds of the entire deposits, and its supply will outlast by many years that of any producer. In time, therefore, this combination, if not dissolved, will own or control every ton of commercially available anthracite known to exist, and while, in almost any other branch of industry it is at least possible for a monopoly to be broken by the influx of fresh capital, attracted by high profits, against a monopoly of anthracite, the supply of which is limited, there can be no protection—only the law can afford relief.

The Department of Justice then prays that the court find as follows:

1. That the Reading Co., the Philadelphia & Reading Coal & Iron Co. and the Philadelphia & Reading Railway Co. and their directors are engaged in combinations and conspiracies in restraint of interstate and foreign trade.

2. That the ownership by the Reading Co. of the stocks of the Reading coal and railway companies is an illegal combination in violation of the Sherman law, and that the Reading Co. be required to dispose of such stocks; that the dissolution of the Reading group be carried out under the direction of the court and not by persons connected with the management; that in the meantime the Reading Co. be enjoined from voting or receiving dividends from the coal and railway stocks.

3. That the ownership by the Reading Co. of the stock of the Schuylkill Navigation Co. is contrary to the Sherman law and that the Reading Co. be directed to dispose of the Schuylkill Navigation stock under the direction of the court and to persons not Reading stockholders.

4. That the ownership by the Reading Co. of the stock of the Wilmington & Northern Railroad Co. is an illegal combination contrary to the Sherman law and that the lease of the Wilmington & Northern physical property and franchises to the Philadelphia & Reading Railway Co. is also illegal; that the Reading Co. be required to dispose of the Wilmington & Northern stock and cancel the lease.

5. That the lease by the Lehigh Coal & Navigation Co., of the Lehigh & Susquehanna Railroad to the Central Railroad Co. of New Jersey, and the agreements relating thereto be declared illegal as restraints of trade and ordered cancelled unless the following alterations are consented to: Making the rental a fixed sum instead of being based on annual receipts as at present; striking out the covenant requiring the Lehigh Coal & Navigation Co. to ship the major part of its coal via the Lehigh & Susquehanna; striking out the agreement that rates to points common to the Lehigh & Susquehanna R.R. and the Lehigh Coal & Navigation Co.'s canal be fixed by mutual agreement.

6. That the ownership of a controlling interest in the Lehigh & Hudson River Railway Co., and the Lehigh & New England Railroad Co., by the Lehigh Coal & Navigation Co. and the Central Railroad Co. of New Jersey, "while themselves joined in a common interest" constitutes a combination in restraint of trade; that the Lehigh Coal & Navigation Co. and the Central Railroad Co. of New Jersey be ordered to dispose of their holdings in said stocks, under the direction of the court.

7. That the ownership by the Reading Co. of a majority of the stock of the Central Railroad Co. of New Jersey be declared an illegal combination in restraint of trade, contrary to the Sherman law, and that the Reading Co. be required to dispose of its stock in the Central Railroad Co. under direction of the court.

8. That the Reading Co. be declared "in and of itself" a combination in restraint of trade, in violation of the Sherman law.

9. That in view of the intercorporate relations existing, shipments by the Philadelphia & Reading Railway Co. of coal owned by the Philadelphia & Reading Coal & Iron Co. be declared to be in violation of the commodities clause of the Hepburn law, prohibiting railroad companies from transporting commodities owned by themselves.

10. That for similar reasons transportation by the Central Railroad of New Jersey of coal owned by the Lehigh & Wilkes-Barre Coal Co. and by the Lehigh & Susquehanna Railroad of coal owned by the Lehigh Coal & Navigation Co. be declared to be in violation of the commodities clause.

The Reading Financing

One of the most important conditions specified in the Reading suit is that the company shall dispose of its holdings in its subsidiaries to outside interests in no way affiliated with it. Owing to the peculiar financing of the company this is a condition that it may find difficult to comply with. The Reading Company has in past years advanced to the coal company, 73 million dollars, on which interest at the rate of only 1 or 2 per cent. has been paid.

But whereas the coal company has been operating at a loss, the revenues realized from the coal freights has more than made up this deficiency. It is essentially a condition of robbing Peter to pay Paul. Without at least a partial cancellation of this indebtedness the Reading will, of course, not be able to find a buyer. On the other hand, the Attorney General bitterly opposed the action of his predecessor, Mr. Wickersham, when the same principle was at issue in the Tobacco cases and flatly refused to consider any settlement in the Union Pacific-Southern Pacific controversy that did not provide for a well-defined separation of these two companies. There is no doubt, therefore, of his position on this feature and with a precedent now established he should be able to carry his point.

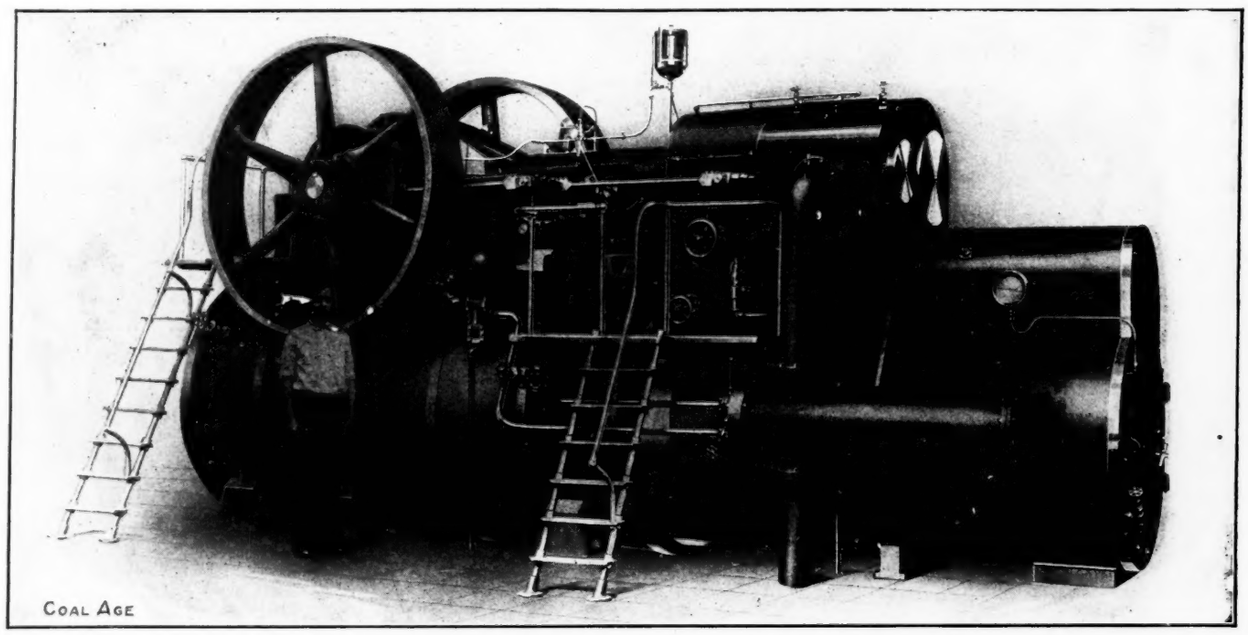
POWER DEPARTMENT

The Buckeye Locomobile

SPECIAL CORRESPONDENCE

SYNOPSIS—With all of her boasted progress along mechanical lines America is often slow in adopting and applying proven methods of economy. A machine is herein described which utilizes the best principles of efficiency for reciprocating engines known to exist and upon which a guarantee of performance can be given, based not upon pounds of steam but pounds of fuel per horsepower-hour.

Among the most notable engineering achievements of the past 20 years has been the development in Europe of the high-efficiency steam engine and boiler unit known variously as the "Locomobile," "Overtype" and "Semi-Fixe." The economical results obtained by this device have been so marked that the Buckeye Engine Co., of Salem, Ohio, has made careful and thorough investigation of the principles employed with a view of offering to the American power-using public a machine of equal merit. During the past year they have constructed and tested a unit of this type which is herein illustrated and described.



THE COMPLETE SELF-CONTAINED UNIT. NOTE SIZE OF BOILER COMPARED TO ENGINE

The Buckeye-mobile is a complete self-contained power plant, consisting of an internally fired boiler on which is mounted a compound engine, the cylinders of which are inclosed in the smoke box. These cylinders are equipped with specially designed piston valves adapted for the use of highly superheated steam. The smoke box also contains a superheater, a reheater and all the necessary piping both for leading the steam from the boiler through the initial superheater to the high-pressure cylinder and that which conducts the steam from the high-pressure cylinder through the secondary superheater or reheater to the low-pressure cylinder.

The superheaters are inclosed in a special casing whereby the hot gases emerging from the boiler tubes are compelled to traverse first the initial superheater and next the reheater before being discharged into the smoke box proper.

The unit comprises also a boiler-feed pump driven directly from the engine valve gear, a closed feed-water heater in the exhaust line from the low-pressure cylinder and a suitable jet or surface condenser with a rotary air pump driven from the main shaft of the engine.

The initial superheater is a single coil of seamless steel tubing through which the steam passes in a direction counter to that of the hot gases. The reheater consists of two headers joined by a large number of small seamless tubes. An effective steam-jet blower enables the operator to thoroughly remove all soot and dust from these superheaters as well as the boiler tubes as often as may be necessary.

In order that the boiler may be thoroughly inspected and cleaned, the furnace and tubes are made removable by simply unscrewing a row of bolts on each end of the boiler. The boiler is supplied with a water column, injector, safety valves, blowoff valve, etc., to conform with the various state laws of the country.

TYPE AND MOUNTING OF ENGINE

The engine is of the center-crank type and is arranged for belting to line shaft, generator or other machinery or a generator may be driven direct through a flexible coup-

ling. The engine bed-plate is rigidly secured at the main bearing end to a massive saddle which spans about one-third of the boiler's circumference. The guide-barrel end rests on a small saddle and is free to slide thereon, thus relieving the bed from the effects of the expansion and contraction of the boiler.

The piston rod passes through metallic packings of a special design which have proven their value for use with high superheat. This kind of packing is also used on the high-pressure valve stem. The unit is provided with suitable platforms, ladders and railings, giving access to all points requiring observation and adjustment.

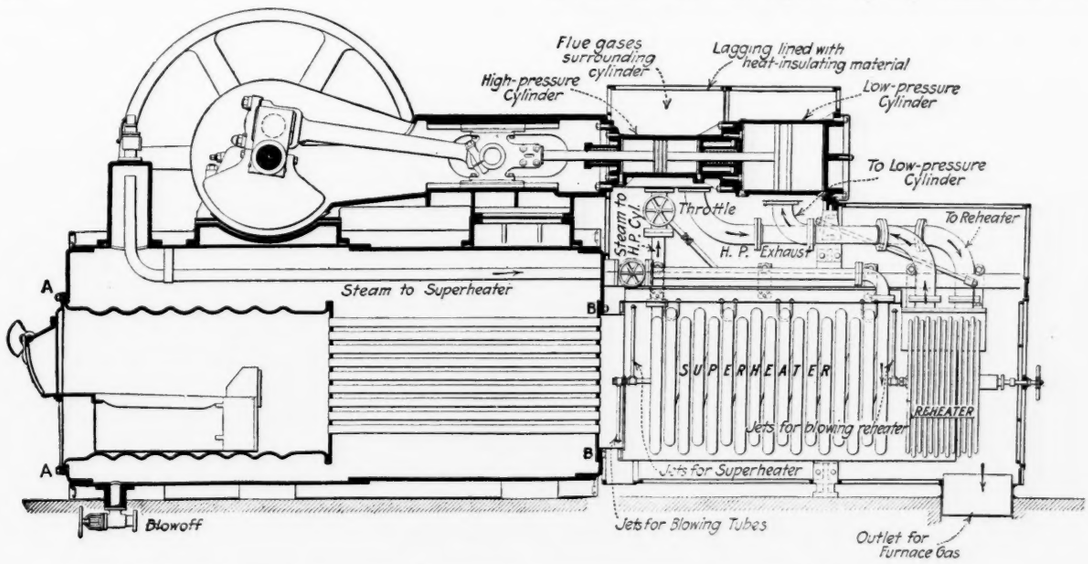
The engine bearings are lubricated by a simple and effective gravity-oiling system, all the oil fed to the machine being gathered at one point and passed through a filter preparatory to being used over again. In the main bearings this system is supplemented by chain oilers. Both cylinders with their valves and piston-rod packings are served by a force-feed lubricator driven from the valve gear.

but includes also the driving of the boiler-feed pump and condenser air pump. This unit makes it possible for the builder to make and fulfill a guarantee of a certain number of pounds of fuel per net delivered horsepower as against the usual custom of guaranteeing pounds of steam per horsepower.

Since one manufacturer makes and delivers the complete unit a division of responsibility between the makers of the various elements which enter into the usual type of power plant is avoided. Owing to the compactness of the plant, its simplicity and high efficiency the cost of operation and maintenance is materially reduced. The fact that such a small quantity of fuel has to be handled makes it possible to greatly decrease the labor cost usually chargeable to power-plant operation.

Only a Small Floor Space Is Required

The floor space required by a plant of this design is about one-half that required by any other form of steam



Cross-Section through Machine, Showing the Various Elements

This unit through its effective utilization of heat makes possible a power cost hitherto unobtainable by any type of small or moderate-sized steam plant. Small installations as a rule are wasteful of fuel, coal consumptions of 5 to 8 lb. per horsepower-hour being quite common. The cause for this may be found in the disposition to employ simple high-speed noncondensing engines using 30 lb. of steam or more per horsepower-hour and the failure to provide the heat-saving auxiliaries commonly installed in large plants. Radiation losses are relatively greater in small engines, boilers and piping than in large plants.

Economy tests of the Buckeye-mobile show that one horsepower can be generated on between 9 and 10 lb. of steam per hour or a trifle over one pound of coal. The fuel consumption curve is nearly flat, that is to say, this excellent economy is obtainable not only at normal load but at practically all loads above 50 per cent. of the rating and therefore the efficiency of the plant is varied but little by a changing load factor.

This expenditure of fuel not only represents that necessary to generate one horsepower at the engine flywheel plant, making any pretense to economy. The unit is extremely accessible in all its parts and has shown in practice a reliability fully equal to if not superior to that of any other prime mover. It is built in sizes from 75 hp. to 600 hp. and is applicable to all power purposes. It ordinarily operates condensing, but where exhaust steam is required for heating purposes the machine operates noncondensing with moderate increase in fuel consumption. In contrast with the internal-combustion engine the Buckeye-mobile is capable of utilizing any available fuel, coal, oil, lignite or refuse.

In the Buckeye-mobile, owing to the intimate connection between all the elements of the plant, there is no radiation loss from pipe lines since all steam lines with their fittings and valves are located in the smoke box and jacketed by the hot flue gases. Radiation from both high- and low-pressure cylinders is prevented by the same means, since both the cylinders and their valve chests are exposed to a current of hot waste gases. Radiation losses from the boiler are reduced to a minimum through the adoption of an internal furnace and effective jacketing of the boiler shell.

Inasmuch as the feed and air pumps are directly driven from the main engine the small amount of power required to drive them is produced with the same efficiency as that shown by the main engine.

The low steam consumption shown by engine proper reacts in every way to the advantage of the various elements of the unit. For example, since the engine uses only 9 to 10 lb. of steam per horsepower-hour as against 20 to 30 lb. required by other machines of like horsepower it is obvious that the capacity of all members of the unit whose function it is to evaporate, convey, superheat or condense this steam may be reduced in like proportion, thus decreasing radiation losses and power required to operate auxiliaries. Since but 9 to 10 lb. of steam are evaporated per horsepower-hour, the loss of heat to the ash pan and chimney is likewise reduced.

Inasmuch as the various elements which go to complete the power plant of the usual form are purchased from a number of different builders, it is seldom that all parts are properly adapted to each other, either as to capacity or suitability of type. Since the Buckeye-mobile is a product of one builder who is free to choose the most suitable conditions as to steam pressures, superheat, etc., he is enabled to so proportion all the elements of the unit as to secure the utmost efficiency of heat utilization consistent with mechanical simplicity and flexibility of application.

Graphite in Boilers

For a period of ten weeks I have been experimenting with graphite as a scale remover, says E. R. Pearce, in *Power*, of Aug. 26, 1913, and find that it proves satisfactory in our boilers. As the action of the graphite is very slow, various boiler compounds have been mixed with it, the idea being to soften the scale a little quicker and allow the graphite to get to the plate sooner.

After three trials, in which careful observations were made, the best results were found to be obtained when using a mixture composed of ½ lb. of graphite mixed with 1 lb. of soda ash, and feeding the mixture at the rate of 1 lb. of mixture to each 20,000 lb. of water. This mixture should undoubtedly vary with the nature of the feed water and working conditions.

The mixture is introduced along with the feed water, and feeds constantly through an ordinary composition feeder, the ash and graphite being thoroughly mixed dry and put into the feeder.

On closely examining the scale which has come away of its own accord, the surface which has been next to the shell will be seen to be dotted with graphite specks. These will be quite clear under a good glass. It has been our experience that practically no scale forms where the old has come off when graphite has been used.

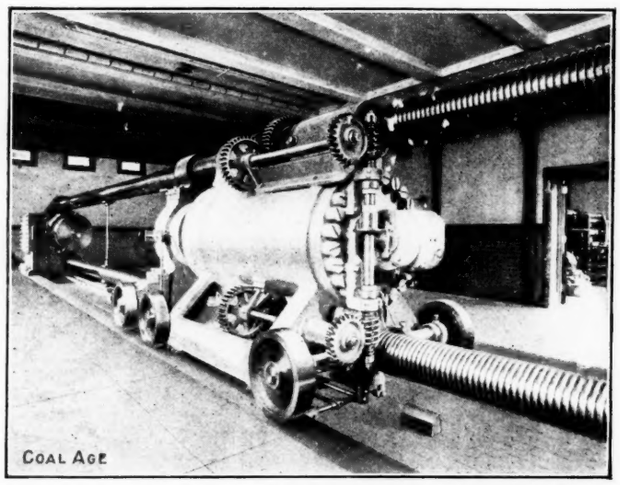
The action of graphite in removing scale is not clear, but it certainly removes the scale, and I am under the impression that if one were to well rub the plates of a new boiler with graphite and water, or some other moistening medium, no trouble would be experienced from scale. It would be interesting to all engineers if some one who has a new boiler going into service would try the experiment and publish the results.

I am shortly going to try graphite in one plant that is badly scaled, and as many chemical works and other factories use the water before it comes to this mill, compounds have all failed, the feed not being of the same composition three hours a day. The only way to use this water is to allow the boilers to scale so as to protect the plate from the corrosive water. The scale is now so heavy as to subject the boiler to bagging at high pressures and temperatures.

The World's Largest Precision Testing Machine

The accompanying illustration is a view of the testing machine, recently installed by the U. S. Bureau of Standards, Washington, D. C. This machine is used for testing columns, blocks, beams, girders and other shapes of steel, wood, concrete or materials employed in construction, in order to determine the breaking strength, spring under load, and other engineering data.

This machine is sufficiently large to test specimens of



GENERAL VIEW OF MACHINE

any length up to 34 ft. It can exert a pull of 1,150,000 lb., or a compression of 2,300,000, yet is sufficiently delicate that the pressure of a finger upon it will be registered.

The machine consists of two principal parts connected by two enormous screws; one part, the further one in the illustration, is stationary, and contains the mechanism by which the force exerted on the specimen is measured. The other, called the press, is movable, and consists essentially of a hydraulic cylinder mounted on wheels. It will be noted that the head of the hydraulic piston is carried upon wheels of its own, and can move independently of the cylinder. The oil which is used to produce the hydraulic pressure is supplied through a pipe which telescopes or elongates as the press is moved.

In testing, the press is moved to the proper point by the small Westinghouse motor, seen mounted upon it. The specimen to be tested is then placed in the machine. If it is to be placed under tension, each end is gripped by jaws, if it is to be subjected to compression, it is held between two heavy plates. The hydraulic piston is then slowly forced forward or pulled back, until the specimen is ruptured or crushed.

A Deane pump, driven by a 20-hp. Westinghouse motor, supplies the oil for operating the hydraulic piston. This pump is capable of delivering a pressure of 3500 lb. per sq.in.

EDITORIALS

The plan of providing baths for miners at European collieries has met with such favor that it is safe to predict the general installation of such facilities at all the important mines. Some points from foreign experience are worth noting. Investigation shows that in estimating for such a plant, eight gallons per man should be allowed, and the water maintained at a temperature of 100 deg. F. Six cents per week per head will cover all running charges, including soap and towels. In Westphalia the average capital outlay amounts to $25 per head. Where baths are provided, they have proved to be an important safeguard, owing to less liability of matches, pipes, cigarettes, etc., being inadvertently taken into the mine. It is also true that home conditions of miners are more satisfactory, both from social and moral aspects.

Legislation and Accidents

The present is an age that might properly be termed "The Legislative Era." When a casualty occurs on one of our railroads, in one of our mines, or at some industrial plant, a cry goes up for more stringent laws. The end that we seek to reach is laudable, but the hasty methods pursued in an attempt to quickly satisfy public clamor are much to be condemned.

Great Britain has likewise passed through a period of legislative activity, and the results obtained may be interesting to us as an indication of what we may ourselves experience. Sixty years ago the accident rate in British mines showed that one man was killed each year for every 249 employed. Conditions in the mines were gradually improved, so that half a century later the deaths equaled only one in 779. About this time (1900) there was a common demand for scores of new laws, designed to cover every possible contingency that might permit of an accident. The result was innumerable acts, which were passed with such rapidity that it was quite impossible for mine owners to observe in letter all the new regulations intended to govern coal mining.

The outcome of this condition was an increase in the British coal-mining death rate. In 1905-9 fatalities reached one in every 764 employed, while in 1910-12 it had risen to one in every 689 employed.

A particular cause for this increase in mining hazards was the inflexible nature of the "Eight Hours Act." This new law limiting the time of employment to an eight-hour shift is applied to all districts, mines and men, regardless of local, natural, economic or individual circumstances.

All around there is more rush and less care. In order to maintain output under the restricted hours, the owners have in many cases been speeding up the work at the expense of safety. More men are needed than heretofore, and there is a tendency to exercise less care in the selection of experienced miners.

Then there is the new one-sided "Workmen's Compensation Act." This law, by insisting upon the same compensation for an aged and delicate miner as for a younger and stronger workman, puts age and experience at a discount, and youth and recklessness at a premium. In places where these older men were weeded out, the result was an increase in the accident rate.

Any law which causes the elimination of aged, skilled and cautious men, spelling preference for young, inexperienced and reckless workmen is certain to encourage the introduction of more hazardous methods. It means an acceleration of haulage and hoisting, hasty and careless repair work at the week end, neglect of bar-setting and propping, and an inevitable increase of danger and death.

It should be understood by everyone that the coal-mining industry is a business where both the natural and economic circumstances vary more widely than in any other occupation. Great care must, therefore, be observed when we attempt to impose uniform working conditions upon all the owners of our coal mines. It is useless passing act after act and issuing regulation after regulation for the provision of safety devices and rescue appliances, if, at the same time, the state enforces other measures which aggravate old dangers and create new ones.

The Mexican Situation

On another page of this issue we print a communication from a large American coal operator located in Northern Mexico, giving details of the damages his company sustained at the hands of the revolutionists. COAL AGE has in the past consistently refrained from commenting upon the unfortunate conditions prevailing in that war-ridden country. But a communication, such as the one referred to, coming as it does from an absolutely authentic source, brings the subject home in a way that much of the contradictory and inflammatory articles in the newspapers have failed to accomplish.

In this instance it appears that the rebel soldiers completely destroyed a million-dollar plant in the short space of about two hours. Having just sustained a defeat at the hands of the federal forces, the rebels started out on a campaign of destruction, offering as their excuse that they wished to prevent the government forces from obtaining coal supplies with which to operate the railroad. Those who know the district will appreciate the fact that this was merely an excuse, and a poor one at that. The Lampacitos plant is but a unit in the coal operations of Northern Mexico, and the fact that it is now destroyed will not interfere with the railroads obtaining a plentiful supply of fuel from neighboring mines, or if need be, from this country.

President Wilson's hesitating policy on the Mexican question has sorely tried the patience of the general public. In the meantime further indignities are being heaped on our subjects in that country and their residence there is steadily becoming more and more untenable. It is to be hoped that our government will soon find a sane and satisfactory solution for the problem without having to resort to war and its attendant horrors.

The Dietetics of Dust

He who would keep himself free from aspersions must not only state carefully the idea he desires to convey, but must also be equally clear in declaring what he does not believe and what points he regards as at present too difficult for his decision. So in passing, we now wish to make a preliminary statement, therein pronouncing our faith in stone dust as an immunizer against mine explosions and declaring our great regard for W. E. Garforth, as the discoverer of the advantages of the use of such dust. We would not have our criticism of a mere detail exalted into a denunciation of a wholesome practice which we believe should become almost universal.

But we think that though Mr. Garforth has so wisely given us a solution, partial or complete, of the coal-dust problem, we should not accept without question *all* that he has recommended. We fear that there is a tendency to regard him as a court of highest resort, but we think it would be wiser to weigh his judgments as carefully as we would those of others less eminent.

Mr. Garforth, in his desire to select dusts which will not injure the internal organs of the operatives exposed to their influence, has subjected the powdered materials to several tests. He has, for instance, taken their specific gravities to determine which of them will rise most easily to meet the advancing flame of an explosion. He has endeavored to ascertain what magnetic particles are in the dust as such materials are likely to be hard and gritty in the lungs. He has investigated the presence or absence of carbonaceous matter, for such material negatives the effect of incombustible dust. Material, such as is found in the roof at the Bruceton galleries, is hardly any better than the dust of a mine where the coal dust has been immunized with the quantity of stone dust recommended by Mr. Garforth.

In these inquiries we follow Mr. Garforth with approval. But he makes other tests which may be of value, but of which we cannot see the use. In fact, we may draw unfavorable conclusions regarding certain dusts from indications which his method of reasoning proves less harmful than other dust, and even entirely innocuous.

Mr. Garforth immerses the dust in digestive fluids to see what proportion of the material is thus removed. He argues that the irritating edges of the inhaled particles can be smoothed away by solution. If it is the action of the dust on the digestive organs which is in question, this might appear to have some reasonable validity. But the objection to dust has been that if sharp it will irritate the lungs and not that it is injurious to the alimentary canal. If the dust comes in contact with the salivary secretions, it will probably never reach the bronchial passages, so that its ability to dissolve in the secretions of the mouth is not an important factor. The dust in the lungs is subjected only to the solvent powers of perspiration and not to all the dissolving actions of the many fluids in the human body.

The digestive fluids of the various organs of the body are peculiar to those organs. The use therefore, of lactopeptine, pepsin, pancreatin, diastase, lactic and hydrochloric acids in tests of dust would be of value only if any like fluids, peculiar under all normal conditions to certain organs, are created in one specific organ, to wit, the lungs, which are not known to generate such secretions. The pulverulent material not being subjected either in turn or at one and the same time to these fluids will enter the bronchioles and alveoli unchanged and will remain to irritate and inflame their surfaces and make them subject to tubercular infection.

But let us suppose for argument that all the digestive fluids of the body are found in the lungs: Of what value would their action be? If the solvents would dissolve all the compounds in the dust into a harmless fluid, we can see that mechanical injury to the lungs as also to the intestines would be thereby obviated. But, we think that to dissolve a part and leave a part is in all probability worse than useless; the part being dissolved is probably colloidal and soft, the part remaining unaffected is likely to be irritant. In fact is not the dissolved part likely to be the sugar coating to the pill?

The unctuous soluble bodies may merely mask and render harmless the gritty and crystalline substances with which they are mixed. If a rock has much non-colloidal silica, it certainly will not be less objectionable after exposure to solution, for surely the silica crystals will be little digested, if at all.

We believe that perhaps some sort of abrasion or friction test is preferable to any form of test by solution. The amount of material abraded on a surface fed with such dust or the angle of rest of bodies sprinkled with it would serve to show its quality as a lung irritant better than any test of solubility or any chemical analysis. We prefer the friction test, however, as it gives the condition of the unaltered dust, whereas abrasion comminutes that dust and may accentuate or minimize its gritty characteristics. The microscopic examination also has merits.

In fact, it would be well that a careful investigation of the best test for dust be made lest we exalt a system of elimination, which will give all the honors to a dust of undesirable character.

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The Small Mine Power Plant

The question of power for mining purposes is an ever-present one. This applies with particular emphasis to the isolated plant or mine which may be, and frequently is, beyond the reach of any central-station transmission line.

Heretofore the small mine has almost invariably been operated by a steam plant, which was in many cases an aggregation of misfits—engines too small or too large, possibly antiquated in design, and certainly ravenous in steam consumption; boilers which were too big or too little for the amount of steam required, probably bricked in by some local mason not accustomed to laying firebrick, and a system of steam and water piping which might be but ill adapted to the work in hand, and with but scant provision made for expansion and contraction.

During the past few years many such plants have been driven to the acceptance of central-station power which, even at a comparatively high price, is more economical than the prevailing type of isolated steam plant.

It is with no little interest, therefore, that we print on another page the description of a new American production, or rather an American adaptation of a machine which has long been successfully used in Europe. When the entire power-producing apparatus—boiler, engine, condenser, superheater, etc.—is constructed in one self-contained unit of remarkably high efficiency by a single builder, it would appear that the power problem of the small isolated mine had been at least successfully solved.

Legal Decision

Railroad Company's Liability for Discrimination—The measure of damages recoverable against a railway company by a mine owner for unjust discrimination against him in refusing to furnish switching facilities, was the difference between the market price of his coal received after the discrimination ceased and the higher price which he would have received for such coal as could reasonably have been mined and shipped during the period of the discrimination. The railway company cannot excuse the discrimination on the ground of a shortage of cars; it being bound in any case to treat all shippers alike. (Pennsylvania Supreme Court, Cox vs. Pennsylvania Railway Co., 87 Atlantic Reporter 581.)

Taxation of Coal in Place—A lease covering "all the merchantable anthracite coal in, upon and under" certain lands, and all certain described veins of coal on the premises, constitutes a sale of the coal in place, thus severing the ownership of the surface from the minerals and making the lessee liable for the taxes on the coal from the date of the sale, in the absence of agreement to the contrary. But if the lessor voluntarily pays the taxes for several years, he is not entitled to recover the amounts so paid from the lessee under an implied promise for such reimbursement. (87 Atlantic Reporter 601.)

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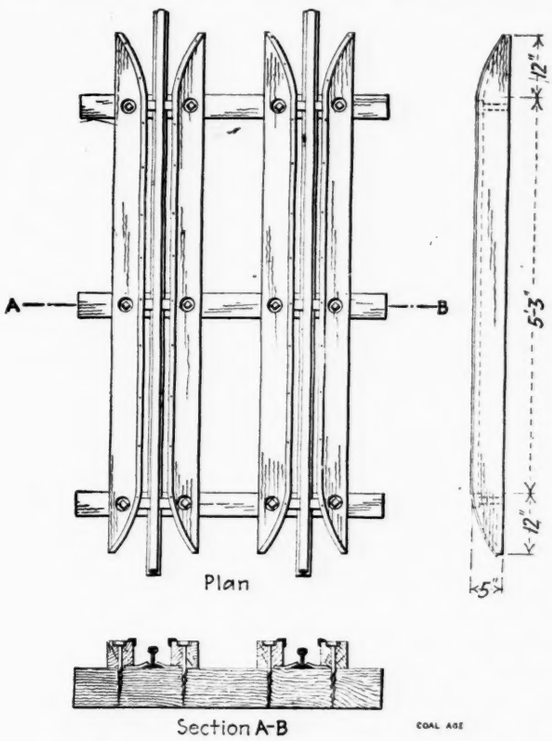

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The Dietetics of Dust

He who would keep himself free from aspersions must not only state carefully the idea he desires to convey, but must also be equally clear in declaring what he does not believe and what points he regards as at present too difficult for his decision. So in passing, we now wish to make a preliminary statement, therein pronouncing our faith in stone dust as an immunizer against mine explosions and declaring our great regard for W. E. Garforth, as the discoverer of the advantages of the use of such dust. We would not have our criticism of a mere detail exalted into a denunciation of a wholesome practice which we believe should become almost universal.

But we think that though Mr. Garforth has so wisely given us a solution, partial or complete, of the coal-dust problem, we should not accept without question *all* that he has recommended. We fear that there is a tendency to regard him as a court of highest resort, but we think it would be wiser to weigh his judgments as carefully as we would those of others less eminent.

Mr. Garforth, in his desire to select dusts which will not injure the internal organs of the operatives exposed to their influence, has subjected the powdered materials to several tests. He has, for instance, taken their specific gravities to determine which of them will rise most easily to meet the advancing flame of an explosion. He has endeavored to ascertain what magnetic particles are in the dust as such materials are likely to be hard and gritty in the lungs. He has investigated the presence or absence of carbonaceous matter, for such material negatives the effect of incombustible dust. Material, such as is found in the roof at the Bruceton galleries, is hardly any better than the dust of a mine where the coal dust has been immunized with the quantity of stone dust recommended by Mr. Garforth.

In these inquiries we follow Mr. Garforth with approval. But he makes other tests which may be of value, but of which we cannot see the use. In fact, we may draw unfavorable conclusions regarding certain dusts from indications which his method of reasoning proves less harmful than other dust, and even entirely innocuous.

Mr. Garforth immerses the dust in digestive fluids to see what proportion of the material is thus removed. He argues that the irritating edges of the inhaled particles can be smoothed away by solution. If it is the action of the dust on the digestive organs which is in question, this might appear to have some reasonable validity. But the objection to dust has been that if sharp it will irritate the lungs and not that it is injurious to the alimentary canal. If the dust comes in contact with the salivary secretions, it will probably never reach the bronchial passages, so that its ability to dissolve in the secretions of the mouth is not an important factor. The dust in the lungs is subjected only to the solvent powers of perspiration and not to all the dissolving actions of the many fluids in the human body.

The digestive fluids of the various organs of the body are peculiar to those organs. The use therefore, of lactopeptine, pepsin, pancreatin, diastase, lactic and hydrochloric acids in tests of dust would be of value only if any like fluids, peculiar under all normal conditions to certain organs, are created in one specific organ, to wit, the lungs, which are not known to generate such secretions. The pulverulent material not being subjected either in turn or at one and the same time to these fluids will enter the bronchioles and alveoli unchanged and will remain to irritate and inflame their surfaces and make them subject to tubercular infection.

But let us suppose for argument that all the digestive fluids of the body are found in the lungs: Of what value would their action be? If the solvents would dissolve all the compounds in the dust into a harmless fluid, we can see that mechanical injury to the lungs as also to the intestines would be thereby obviated. But, we think that to dissolve a part and leave a part is in all probability worse than useless; the part being dissolved is probably colloidal and soft, the part remaining unaffected is likely to be irritant. In fact is not the dissolved part likely to be the sugar coating to the pill?

The unctuous soluble bodies may merely mask and render harmless the gritty and crystalline substances with which they are mixed. If a rock has much non-colloidal silica, it certainly will not be less objectionable after exposure to solution, for surely the silica crystals will be little digested, if at all.

We believe that perhaps some sort of abrasion or friction test is preferable to any form of test by solution. The amount of material abraded on a surface fed with such dust or the angle of rest of bodies sprinkled with it would serve to show its quality as a lung irritant better than any test of solubility or any chemical analysis. We prefer the friction test, however, as it gives the condition of the unaltered dust, whereas abrasion comminutes that dust and may accentuate or minimize its gritty characteristics. The microscopic examination also has merits.

In fact, it would be well that a careful investigation of the best test for dust be made lest we exalt a system of elimination, which will give all the honors to a dust of undesirable character.

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The Small Mine Power Plant

The question of power for mining purposes is an ever-present one. This applies with particular emphasis to the isolated plant or mine which may be, and frequently is, beyond the reach of any central-station transmission line.

Heretofore the small mine has almost invariably been operated by a steam plant, which was in many cases an aggregation of misfits—engines too small or too large, possibly antiquated in design, and certainly ravenous in steam consumption; boilers which were too big or too little for the amount of steam required, probably bricked in by some local mason not accustomed to laying firebrick, and a system of steam and water piping which might be but ill adapted to the work in hand, and with but scant provision made for expansion and contraction.

During the past few years many such plants have been driven to the acceptance of central-station power which, even at a comparatively high price, is more economical than the prevailing type of isolated steam plant.

It is with no little interest, therefore, that we print on another page the description of a new American production, or rather an American adaptation of a machine which has long been successfully used in Europe. When the entire power-producing apparatus—boiler, engine, condenser, superheater, etc.—is constructed in one self-contained unit of remarkably high efficiency by a single builder, it would appear that the power problem of the small isolated mine had been at least successfully solved.

Legal Decision

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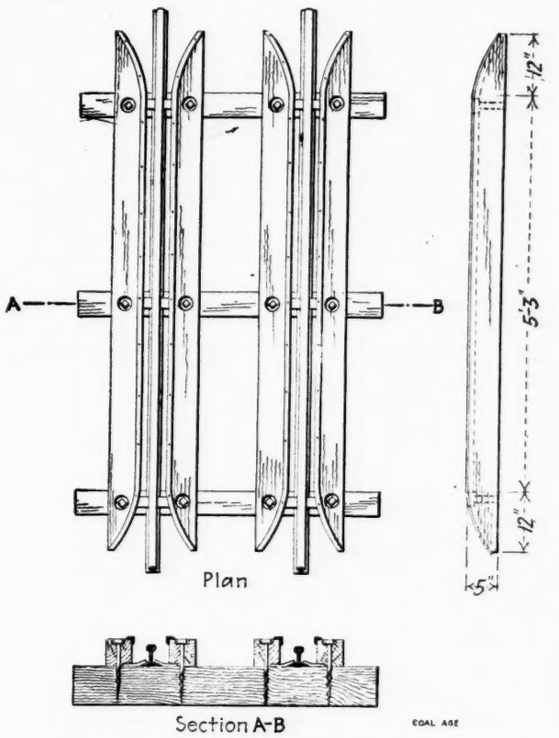

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SOCIOLOGICAL DEPARTMENT

Rules for Motormen

The *Engineering and Mining Journal* quotes the following rules for motormen from the Inland Steel Co.'s book of rules and with trifling changes they would serve for use in coal mines:

(1) Operators should see that their motors are in good working order and furnished with the necessary tools, supplies and signals. They should thoroughly inspect the motor and test the brakes at the beginning of each shift; see that they have a supply of sand; and immediately report any defects to the master mechanic.

(2) They should not leave the motor except in case of necessity, and then have some competent person in charge. No one except motormen and electricians should be permitted to operate the motors.

(3) Operate cars at such a speed as to have full control at all times. Avoid bumping cars violently.

(4) The trolley pole should follow and not lead the motor, except in places where this is impossible. When the trolley pole is ahead the motor should be moved slowly.

(5) The trolley pole should not be turned while the motor is in motion.

(6) There should be a red light on the advancing end of all trains when the motor is not in front and the light on the motor should be kept lighted at all times when the motor is in use.

(7) Motormen should ring the bells on their cars at frequent intervals and especially when approaching crossings, curves, narrow places in the drifts or crosscuts, or points where men are known to be working on or near the track.

(8) Motormen should promptly report any defective condition of electrical equipment to the electrician, mining foreman or shift boss.

(9) No one except motormen and brakemen should ride on a motor or car without special permission from the superintendent or foreman.

(10) Men not employed as motormen or switchmen should not couple cars, throw or alter the lineup of switches.

(11) Trammers, or other employees, should not leave cars at or near switches or crossings, in such a position that they will not clear motors or cars moving on another track.

(12) When cars are pushed from where they have been filled to a point where they can be handled by the motors, the trammers should notify the crew of the motor either by remaining near the cars or by placing lights on them. The same rule should be followed in the case of timber trucks or other equipment left standing on the tracks where motors are liable to approach from either direction.

(13) Men having occasion to work on motor-car tracks should protect themselves by placing blue lights on the track.

(14) Do not place any strain on mine timbers when replacing cars on track.

(15) Do not carry high explosives on electrically operated cars.

(16) Brakemen should always carry lanterns.

(17) Brakemen should not ride on the front end of cars except in case of urgent necessity.

(18) Operators and brakemen should exercise great care not to get caught between cars and timbers. When riding, they should not stick their feet out at the side of the car, as they are apt to do if in a kneeling position.

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Qualifications for Rescue Work

S. J. Bridges describes the recovery work at the Cadeby Main mine, in the *Colliery Engineer*, and incidentally says: A man who volunteers for training should be physically strong, and have good lungs, and no heart troubles. When passing the doctor he should be quite candid in answering questions, and if he has the least doubt of his own nerve, he had better not take on the work, as he will be sure to hinder the work of the team to which he belongs, and may lose his own life and cause others to do the same. The writer has seen men attempt to do this work who bravely tried to do what they believed to be their duty, but owing to physical unfitness were incapable of proceeding, and had to be brought out by their comrades.

In other cases men otherwise fit have been kept at work too long without a proper interval for rest, and have returned to the work when they were not in a condition to stand it. The breathing of an artificial atmosphere acts differently on some men from others. Some of the men came out with pulses beating at 110 per min., and even more, and were soon all right again; others left the mine and were unable to go in again that day. In no case were the men able to do the two hours' work with which they had been tested.

The Unnerved Rescuer

The captain of a team should be an observant man. He must watch his aides and his apparatus while at work. Moreover his time limit must be controlled by the weakest of his party. Also when his team has been working several shifts and is accustomed to the work and apparatus, if he should then be obliged to take in a reserve man for the first time, he will have to watch him carefully, or his new comrade may cause a disaster. Especially is this the case when his men find dead bodies. The first seen and handled give most men a severe shock; this generally wears off, but a captain whose team does such work for the first time is in no enviable position.

If he has a man who faints or collapses, his task is then comparatively easy, but if the new rescue man loses his head and commences to run hysterically, falls and endeavors to run again, the captain and his men will be in great jeopardy. Their own apparatus can only be

worn by exercising great care, and to have to hold or carry a man frantic with fright is an impossibility, and a captain who meets with such an experience will be very fortunate if he and his comrades get out safely.

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Don'ts for First-Aid Men

By Allen S. Snyder*

Don't touch a wound with the hands.

Don't disturb blood clots.

Don't be rough with the patient.

Don't probe for a bullet or any other body imbedded in the flesh.

Don't wash wounds unless you sterilize the water.

Don't pull or tear off clothing—cut it away.

Don't attempt to remove pitch, varnish or wax from a burned surface.

Don't bring ammonia too close to the nostrils.

Don't touch the eye with dirty fingers or an unclean cloth.

Don't put bandages on too tight.

Don't let the patient know his condition is serious.

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Program of American Mine Safety Association

On Sept. 22, 23 and 24 a large number of prominent mining men, surgeons of mining companies, and the miners connected with the rescue and first-aid work from many parts of the United States will attend at Pittsburgh the second meeting of the American Mine Safety Association. Western Pennsylvania and the Pittsburgh district in particular will be largely represented. H. M. Wilson, chairman of the executive committee of the American Mine Safety Association, says that the reports received indicate that the meeting will be largely attended, McAlester, Okla., Trinidad, Colo., and other equally distant points sending big contingents of men who are interested in anything which will add to the safety of their mining operations. An interesting program of papers and discussions has been prepared, and arrangements have been made to visit points of interest in and about Pittsburgh.

Handsome prizes have been offered for the men who compete in the mine-rescue contest at Arsenal Park on Sept. 22. The Draeger Oxygen Apparatus Co. has donated an oxygen inhalator, complete in a box; the Hirsch Electric Mine Lamp Co. will present a Hirsch silver-plated miner's electric cap lamp, and the American Mine Safety Association provides handsome medals which will be given individual contestants. Entries for this event have been received already from the Penn-Mary Coal Co., the H. C. Frick Coke Co., and the Westmoreland and Jamison Coal & Coke Companies.

At the same time there will be held a first-aid contest somewhat similar to those held elsewhere in the mining regions. For this a number of handsome prizes have also been received, notably from Johnson & Johnson a first-aid cabinet and also a first-aid instruction outfit; from Bauer & Black a first-aid cabinet; from the American Red Cross and the American Mine Safety Association a set of medals for the individual contestants. The following entries have already been received for this event: Consolidation Coal Co. (two entries), Wisconsin Steel Co., Allegheny Coal Co., Rochester & Pittsburgh Coal & Iron Co., Allegheny River Mining Co., Tower Hill Connellsville Coke Co., Penn-Mary Coal Co., Youghiogheny & Ohio Coal Co., Oliver & Snyder Steel Co., Puritan Coke Co., Pittsburgh Terminal R.R. & Coal Co., Manor Gas Coal Co., Penn Gas Coal Co., Pittsburgh Baltimore Coal Co., New Alexandria Coal Co., Westmoreland Coal Co., Jamison Coal & Coke Co., Vinton Colliery Co.

The Bureau of Mines has arranged a big experimental explosion at their mine at Bruceton. This will be the first explosion exhibit given at the mine since its completion. There was an experimental explosion in the mine in 1911 on the occasion of the National Mine Safety Demonstration, and another in 1912, but in both cases the mine was as yet only partly opened, and the various electric recording apparatus, and the apparatus for controlling the explosion had not been placed, so that practically all that the mining public could see was an explosion of dust. On Sept. 23, however, it will be possible for those interested in such matters to see just exactly what causes the explosion; how the explosion wave acts; the speed and the pressure and other important items, as these will all be automatically recorded in the instrument room. A number of rescue men fitted with artificial breathing apparatus will enter the mine immediately after the explosion, so as to illustrate how they can go into a mine while it is still smoking and full of gas.

On the evening of the 23d a local committee of members of the American Mine Safety Association and the Bureau of Mines will give a smoker in the Fort Pitt Hotel to the visiting mining men. Music is expected, and there will be an exhibition of motion pictures exhibiting safe and unsafe practices in mining, and illustrating methods of digging coal, and of handling it both underground and on the surface.

*Instructor in first aid, Cambria Steel Co., 1005 Somerset Ave., Winber, Penn.

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First-Aid Meets

Invitations have been sent out for the fourth annual contest of the first-aid corps of several coal companies of the Shamokin region, to be held at Edgewood Park, Shamokin, Sept. 13. The companies to be represented in the contest are Susquehanna Coal Co., Mineral R.R. & Mining Co., Summit Branch Mining Co., Lytle Coal Co., and Lykens Water Co.

Considerable interest has been manifested at all the collieries under the control of the Lehigh Valley Coal Co., in the selection of first-aid teams from each division to fight for the championship of the entire company. The ten teams representing the various collieries of the Lackawanna division, with headquarters at Pittston, Penn., held a four-event contest to determine which team should represent the division, with the result that Westmoreland colliery was awarded first place with a percentage of 100. The Exeter colliery outside team finished second, with a rating of 99¾. Other collieries represented were William A. Heidelberg No. 1, Seneca, Stevens, Maltby, and two inside teams from Exeter.

The four events were as follows: (1) Open wound over the right temple, fracture of the left collarbone and fracture of the jaw. (2) Gas burns on face, head and left arm. (3) Fractured ribs on the left side and fractured left arm. (4) Compound fracture of the left leg and simple fracture of the right upper arm. The members of the winning teams are as follows: Westmoreland, James R. Morris, Capt., Edward Reap, Thomas Ridgly, Walter Jacoby, Joseph Johnson, Fred Halpin, subject; Exeter Outside, Charles Kluck, Capt., Charles Marlow, John Akens, Robert Reid, William Finn, Benjamin Thomas, subject. The Westmoreland team will represent the division at the meet to be held at Hazle Park, Sept. 13.

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Weyanoke Gardens

The Weyanoke Coal & Coke Co. of Glatto, Mercer County, W. Va., has for five years given prizes for the best gardens at their mining villages, and has given the householders stable litter and lime to fertilize their flower and vegetable beds. The prizes amount every year to $110. The first prize was $20 and the other nine formed an arithmetical series diminishing regularly by $2. An additional $5 was given to the lady having the prettiest flowers, and a porch settee to the lady whose flower display was next in order of merit. The judges this year were Judge H. A. Ritz of Bluefield, E. A. Schubert, industrial agent of the Norfolk & Western Ry. and W. O. Frith of the "Princeton Progress."

Special consideration was given to the sanitary conditions around the houses, and the difficulties of location on the steep hillsides were also given due weight in according relative merits.

It was noted that those tenants who were not seeking to obtain a prize were keeping more sanitary and orderly premises than they were last year. The shower baths which the company was constructing last year have been completed, with compartments and lockers for the benefit of the miners. Five baths are set apart for the white and five for the colored employees, and they are all largely used and appreciated.

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If the old workings in a mine are roughly stopped off there is always apt to be leakage of the confined gas, which fouls the air and may sometimes cause an explosion. There is always the possibility of inflammable gas gathering in old workings, in dangerous quantities when they are shut off, and the miners may accidentally hole into these old workings and cause an explosion; or this gas may be driven out, by roof falls, into the live workings and an explosion result.

DISCUSSION BY READERS

The Liquor Problem in Mining

As to whether the drink evil is increasing or decreasing among miners, at this time, is not made very plain by the arguments that have been used on either side of this question; nor yet whether the drink evil increases or decreases with the advance or fall of wages. Opinions seem to differ, also, as to the best and most successful plan or method to be adopted for decreasing this evil among miners, as various suggestions and opinions have been advanced.

W. P. Oakes, vice-president of the Sunnyside Coal Co., Colo., in his argument for a mining-camp canteen, COAL AGE, March 15, p. 420, makes the following statement:

> It is useless to argue against the existence of a saloon of one sort or another in or about a mining camp. If the men cannot get their beer, or whatever they want to drink, they will buy it from bootleggers, ... or they will go to some other camp where they can obtain it.

Are miners, as a class, down to the point where they *must* have drink? Does giving miners more opportunities and better facilities to drink, decrease the drinking? Will the establishment of more club and drink houses, in mining camps, solve or reduce the drink habit among miners? Is it not true that the more opportunities drinking miners have to drink and the less restraint they are under in this respect, the more they drink; and the more they drink, so much the more they want to drink; and the more unreliable and worthless they become as miners and the less valuable as citizens.

The tendency and influence of all saloons and drink houses are downward. They are not the places where the best thoughts are cultivated. Even in the best clubs or drinking houses, in mining camps (if there be any best), there is no moral and uplifting influence found. On the other hand, the influences in far too many of these drinking dives are foul and well adapted to the growth of idleness and anarchy. Why, then, establish any of these degrading institutions, hoping thereby to refine and reform drinking miners.

It requires no long argument to convince the average man that there is not so much drinking in a mining camp where the drink is difficult to obtain, as where it is plentiful. I admit it can scarcely be removed so far or made so difficult to get, but that the confirmed drinker will manage, in some way, to get it, at times. But the boys will not go to the same expense and trouble to get it as the old drinker. In a few years these boys will be men—men who care nothing for drink and drinking resorts. On their account, the saloons and drinking clubs should be removed from all mining camps. By the proper enforcement of law, saloons, drinking clubs and bootleggers can all be removed from mining camps and none should be more interested and more active in this movement than mine officials.

The solution of the liquor problem in mining is in the direction of enforcing and obeying laws, education and the improvement of conditions. The coal mines of the country need officials with more disciplinary powers and less drinking habits; men who have the confidence and respect of their best miners; men who are strictly sober and temperate themselves; men who take interest in bettering the physical and intellectual condition of the miner, by furnishing him with better houses, better streets, better sanitary conditions in the mine, better ventilation, better schools, better discipline and better system. These things will have a greater tendency toward reducing the drink habit among miners than the establishment of the canteen, in mining camps.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

The Mine Air Current and Explosions

The contribution of Mr. Parfitt on this subject, COAL AGE, Aug. 9, p. 208, while interesting as a paper on ventilation, fails as a reply to the discussion on the Cincinnati mine explosion. The main feature of that discussion was the effect of the mine-ventilating pressure to increase or decrease the gaseous condition of the mine. Mr Parfitt makes no mention of this important factor, but draws attention to the fact that the pulmonary diseases suffered by miners are brought on by the vitiated atmosphere of many mines. This fact is commonly admitted by all.

At least one mine inspector, in England, has referred to the premature death of miners caused by insufficient ventilation. However, I fail to find in the previous articles, by myself and Mr. Verner, any reference suggesting such unsanitary conditions in the Cincinnati mine. Any argument along this line would naturally be taken as referring to conditions some time back, as, under the present system of mine inspection, if an inspector finds the ventilation of a mine inadequate, he simply shuts down the mine. We can, therefore, assume that there is sufficient air traveling in the average modern mine to make the workings sanitary, in every respect, and thus eliminate this question from the discussion. But, after all has been said and done, mine explosions still continue, which we are apparently helpless to prevent.

Mr. Parfitt is wrong in supposing that I suggested that the ventilating current diminished or prevented the outflow of gas from the strata. My claim was (July 5, p. 25) that while the exhaust system of ventilation allows the expansion of gas accumulated in the gobs, the compressive system of ventilation acts to drive this gas back and counteracts, to a certain extent, the effect of a falling barometer. In this reference, I only considered the relative tendency of these two systems of ventilation to increase or decrease the outflow of gas from the gobs. I also drew attention to the fact that the ventilating pressure could be increased, if desired, by the use of a regulator, without increasing the quantity of air in circulation.

The relative effect of the two systems of ventilation that I have mentioned may be illustrated by supposing

that the ventilating pressure required in a certain mine is equivalent to a 2-in. water gage or $5.2 \times 2 = 10.4$ lb. per sq.ft. If the atmospheric pressure is 14.7 lb. per sq.in or $14.7 \times 144 = 2116.8$ lb. per sq.ft., the actual pressure on the air, in the compressive system, is $2116.8 + 10.4 = 2127.2$; and in the exhaustive system, $2116.8 - 10.4 = 2106.4$ lb. per sq.ft. The difference of pressure between the two systems is, therefore, twice the ventilating pressure or, in this case, $2 \times 10.4 = 20.8$ lb. per sq.ft.*

In the extraction of coal, there are many causes that operate to prevent the roof from settling uniformly; and it is commonly estimated that one-sixth of the original space occupied by the coal is available for the accumulation of gas. On this basis, 10,000 cu.ft. would be a small estimate for the possible accumulation of gas in old workings. Since the ratio of expansion of gas is equal to the inverse ratio of the pressure it supports, the expansion of this volume of gas, due to a fall of barometer from, say 30 to 29 in., is determined by the proportion

$$29 : 30 : : 10{,}000 : x = 10{,}345 \ cu.ft.$$

The quantity of gas thrown out onto the airways, by this fall of barometer, would be $10{,}345 - 10{,}000 = 345$ cu.ft. The danger would be greater if this fall of barometer took place suddenly or at a time when the ventilating current was impeded; or when, for any reason, proper attention was not given to the change of pressure. In this connection, it is important to notice that the waste places in mines where gas is liable to accumulate and often difficult to remove, can frequently be kept clear of gas by drill holes sunk from the surface, through which the gas may escape when the compressive system is employed.

It is worthy, also, of note that mines in which large quantities of carbon dioxide are generated will generally require a greater ventilating pressure in order to effectively remove this gas. The reason is due to the greater specific gravity of the gas, which causes it to sink to the low places in the mine and to offer an increased resistance to the ventilating current. The air has a tendency to pass over this gas, unless the same is distributed by the passing of cars or other cause. My own observation leads me to conclude that where a shorter airway is more or less obstructed by the presence of blackdamp, the air current will often travel a longer route, owing to the increased resistance in the shorter airway, caused by the gas. A higher ventilating pressure might, in a degree, overcome this difficulty.

In closing I want to say that the increase of ventilating pressure, or the use of the exhaustive or compressive system of ventilation, as I have suggested, does not imply a depletion of the ventilating current to which Mr. Parfitt alludes.

ROBERT MCCUNE.

————,Penn.

[*As a matter of fact, the difference in the actual pressure on the air, in the use of these two systems of ventilation, or twice the ventilating pressure is so slight as compared with the atmospheric pressure that the relative effect on the expansion of gases in the void or abandoned places, in mines, is almost inappreciable. Likewise, the relative effect on the emission of gas from the strata is practically inappreciable. There is, however, a great advantage possessed by the compressive system of ventilation as compared with the exhaustive system. This advantage relates to the mine pressure, in the compressive system, being greater than that of the atmosphere; while, in the exhaustive system, it is less than that of the atmosphere. As a result, the compressive system tends to drive the gases that accumulate in abandoned workings out through every crevice, fissure or opening, into the outside atmosphere, thus making these crevices and openings vents to the mine. On the other hand, the exhaustive system tends to draw these gases into the mine workings, owing to the pressure of the atmosphere through the same crevices or openings

Another important relative effect of the two systems of ventilation is that when a fan is running on the compressive system and an accident occurs to the fan or in the mine airway, by which the circulation is reduced and the mine pressure decreased, there is a sudden outflow of gas from the abandoned and void places in the mine that may cause trouble, being sudden and unexpected. On the other hand, when the fan is working on the exhaust system of ventilation, the same accident to the fan or in the airway, would result in an increase of pressure on the gases confined in the abandoned workings and other void places in the mine. This condition favors the exhaust system, but is a condition that should be provided for, as far as possible, by efficient mine equipment and inspection.—Ed.]

Recovering Thin Overlying Coal

I noticed the question of J. H. S., COAL AGE, Aug. 30, p. 319, who asked for the best method of drawing back the pillars in a 7-ft. seam of coal overlaid with from 4 to 7 ft. of sand slate, and, at the same time, recovering the 21 in. of coal above this slate.

I want to say, in the first place, that this mine should have been worked on the longwall plan, from the start. The mine should have been opened on the triple-entry system and cross-entries or headings driven to the boundary, to the right and the left of the main entries and 300 ft. apart. These headings should then be crosscut at the boundary line, from one to another, thereby forming a long line of working face, each section being 300 ft. in length.

Work should then be started on the retreating plan, and three rows of posts should be carried along the face to break the sand slate forming the roof. The back row of posts is drawn and the posts reset as the work progresses. It may be necessary to shoot the sand slate, at first, in order to start the break; but when this is once started the posts will be sufficient to break the roof. It may happen that explosive gas will be found in the upper seam overlying the slate and proper precaution should be taken in this regard.

I note, however, that you say this work has all been driven to the boundary line on the room-and-pillar system. In that case, the only thing left to do is to retreat, as above stated. Whether the rooms have been turned as right-hand or left-hand rooms will determine the question of where the work should be started. If the track follows the straight rib, the work of drawing back the pillars will be comparatively easy; but if the tracks are in the middle of the rooms, it makes a hard proposition, as the waste is said to have been stored in the rooms, which are probably full to their capacity. The width of the rooms or thickness of the pillars is not mentioned, but it looks as if the work of recovering the thin seam of coal above the slate will cost more than the coal is worth. I would say, if you can get all the pillar coal, you will be doing well.

SAMSON SMITH.

Mineral, Va.

Fire Protection in Mines

Referring to the question of adequate fire protection at mines, which has been recently mentioned in these columns (COAL AGE, July 26, p. 136), I notice that many of the mines I visit are neglecting this matter. I consider it of the greatest importance that mine officials should give closer attention to the protection of their properties from fire; and, in urging this important point, I want to make a few suggestions.

In the first place, every mine should have a good map, drawn to a scale of, say 40 or 50 ft. to the inch, and showing all wells or ponds, water lines and fire plugs. The map should show all structures located on the properties, stating brick or frame. Every company should have a properly organized fire-fighting force and a system of signals to summon the men, in case a fire should break out. These signals should be printed in clear, bold type and posted in a prominent place, so that the men could become familiar with them.

In order to maintain all fire appliances and apparatus in good condition and ready for use in case of emergency, I would suggest the following:

1. Wherever fire pails must be kept in places where the water will freeze, it may be almost entirely prevented by dissolving two or three ounces of common salt and as much salsoda in boiling water, allowing this amount of salt to each pail, or four or five pounds to a cask of water.

2. Examine all tanks and pipes, fittings and valves regularly, whether for steam heating, general water service or fire protection. The purpose of this is to see that none are frozen or have been frozen and broken; and to make sure that all are in good condition. If this examination shows that any are liable to freeze, provide the necessary protection to insure the entire system.

3. Open all valves and try all outlets to see that all pipes are free and ready for service.

4. Make it your business to know if all engineers fully understand the purpose and operation of every valve and pipe.

5. Try all pumps at regular periods and see that they are in proper working order. A pump that will not take water quickly is no good in case of fire.

6. Test all hydrants and indicators to see that they drain properly to prevent freezing in cold weather.

7. See that the night watchman is thoroughly versed in the rules and familiar with all valves, pipes, etc.

8. Examine all suction pipes to see that they are not partially clogged at the strainers so as to cut down the efficiency of the pump.

9. Do not let your fire extinguishers go over six months without recharging them.

Some companies have formed fire brigades in which the men take much interest. Another thing I should not forget to mention, as it is very important, is testing the lines of hose. This should be done at least once every three months, using the same water pressure that would be used in case of fire. If the hose is weak or wearing out the test will show the trouble, which should be remedied before it is too late.

If these suggestions are carried out and careful supervision kept, the works should not suffer much from fire.

PENNSYLVANIA ENGINEER.

Pittsburgh, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

MEASUREMENT OF AIR CURRENTS

The measurement of air currents, in mining practice, involves the careful observation of the velocity and pressure of the current and the accurate measurement of the sectional area of the airway. From these data the volume and power of the air current are determined.

Requirements—The mining laws of the state, in most cases, require a specified volume of air per man, per minute, circulated throughout the mine. In order to meet this requirement, it is necessary to estimate the power that will produce such quantity in a given mine.

The Mine Potential—Every airway and every mine has a certain resisting power, in respect to the circulation of air. For this reason, the same power will circulate different quantities of air through airways that differ only in respect to their size and length.

The formulas of mine ventilation show the following relation of the quantity of air circulated to the power producing the circulation, and the sectional area to the rubbing surface of the airway.

$$\frac{Quantity}{\sqrt[3]{Power}} \quad varies\ as \quad \frac{sectional\ area}{\sqrt[3]{rubbing\ surface}}$$

Or, say: quantity (cu.ft. per min.) = q; power (ft. lb. per min.) = u; sectional area (sq.ft.) = a; and rubbing surface (sq.ft.) = s; the unit resistance being k, we have

$$\frac{q}{\sqrt[3]{u}} = \frac{a}{\sqrt[3]{ks}}$$

The first of these expressions, being given in terms of the power and quantity of air circulated, may be called, properly, the "potential of the circulation"; while the second expression, being given in terms of the airway, is the "potential of the airway," or the "mine potential." The significance of the term "potential," in this connection, is apparent since it describes the capacity of an airway or mine in respect to the volume of air it will pass, per unit of power.

The Value of Mine Potential—Calling the potential factor X its value for any given mine or airway is calculated by the formula

$$X = \frac{a}{\sqrt[3]{ks}}$$

The value of the potential for the circulation of any quantity (q), by any power (u) or pressure (p), is found by the formula

$$X = \frac{q}{\sqrt[3]{u}} = \sqrt[3]{\frac{q^2}{p}}$$

The value of the potential lies in the fact that it gives to every mine or air split a definite value that enables a correct comparison to be made and the proper type of ventilator and system of ventilation to be chosen.

The Coal Age Pocket Book

CALCULATIONS

Potential of Airway—Calculate the potential of an airway 6x10 ft., in cross-section, and 2000 ft. long.

Solution—The sectional area of this airway is $6 \times 10 = 60$ sq.ft.; the rubbing surface is $2(6 + 10)2000 = 64{,}000$ sq.ft. The potential of the airway is, therefore,

$$X = \frac{a}{\sqrt[3]{ks}} = \frac{60}{\sqrt[3]{0.00000002 \times 64{,}000}} = 552.6$$

Potential of Circulation—What is the value of the potential factor in the circulation of 60,000 cu.ft. of air ,by 10 hp.?

Solution—The potential of this circulation is

$$X = \frac{q}{\sqrt[3]{u}} = \frac{60{,}000}{\sqrt[3]{10 \times 33{,}000}} = 868.2$$

Find the potential value for the same volume of air circulated under a pressure of 8 lb. per sq ft.

Solution—The potential value, in this case, is

$$X = \sqrt[3]{\frac{q^2}{p}} = \sqrt[3]{\frac{60{,}000^2}{8}} = 766.3$$

Power, Pressure, Quantity—By transposing the formulas for potential, it is possible to calculate the power or pressure required to circulate any given quantity of air against any given mine potential; or to find the air volume a given power or pressure will produce, for any given mine potential.

Example—Find the (1) power, and (2) pressure required to circulate 24,000 cu.ft. of air through an airway 5x14 ft. in section and 3000 ft. long?

Solution—The area and rubbing surface of the airway are: $a = 5 \times 14 = 70$ sq.ft.; and $s = 2(5 + 14)3000 = 114{,}000$ sq.ft. The potential factor of this airway is then

$$X = \frac{a}{\sqrt[3]{ks}} = \frac{70}{\sqrt[3]{0.00000002 \times 114{,}000}} = 531.8$$

(1) Power, $u = \left(\frac{q}{X}\right)^3 = \left(\frac{24{,}000}{531.8}\right)^3 = 91{,}900$ *ft.-lb. per min.*

(2) Pressure, $p = \frac{q^2}{X^3} = \frac{24{,}000^2}{531.8^3} = 3.83$ *lb. per sq.ft.*

or, $p = \frac{u}{q} = \frac{91{,}900}{24{,}000} = 3.83$ *lb. per sq.ft.*

Example—Find the volume of air circulated in the same mine, by (1) 10 hp.; (2) a pressure of 7.8 lb. per sq.ft.

Solution—

(1) By 10 hp., $q = X\sqrt[3]{u} = 531.8\sqrt[3]{10 \times 33{,}000} = 36{,}750$ *cu.ft. per min.*

(2) By 7.8 lb., $q = X\sqrt{Xp} = 531.8\sqrt{531.8 \times 7.8} = 34{,}250$ *cu.ft. per min.*

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—Under what circumstances may a body of gas fail to be removed after restoring the ventilation?

Ans.—It frequently happens that the brattices, stoppings, air bridges or doors have been destroyed, which prevents the air current from being properly distributed or conducted to the working face or other places where gas may have accumulated. The ventilating current is not properly restored until all these means for the distribution of the air have been replaced.

Another reason why the gas may not be removed when the current is restored is that a heavy fall of roof may have occurred in one of the airways, by reason of which the quantity of air, in that section of the mine, is reduced and the velocity of the air current is insufficient for the removal of the gas. It may happen, also, that gas is being generated, at the point in question, more rapidly than it is removed by the air current, which would make it appear that the gas was not being removed.

Ques.—Would you allow any class of workman to enter a return airway contaminated by gases emanating from a mine fire; and for what purpose?

Ans.—Only such persons as are required for the work of removing the gases should be permitted to enter the airway, and then only for the purpose stated. The men selected for the work should be competent men who are experienced in the handling of gases and the use of the safety lamp.

Ques.—What weight of electric motor will be required to haul four cars, gross weight 3 tons each, up a grade, the tangent of whose angle of inclination is 0.03492. Assume a coefficient of friction 0.025 and a coefficient of traction, 0.16.

Ans.—The gross weight of the loaded trip of four cars is 4 (3 × 2000) = 24,000 lb. The grade being slight, practically 3.5 per cent., the gravity pull of the loaded trip is found by multiplying its gross weight by the tangent of the angle of inclination; thus,

Gravity pull, $24{,}000 \times 0.03492 = 838$ *lb.*

In like manner, the friction pull is found by multiplying by the coefficient of friction; thus,

Friction pull, $24{,}000 \times 0.025 = 600$ *lb.*

The drawbar pull is the sum of the gravity pull and friction pull of the load; thus,

Drawbar pull, $838 + 600 = 1438$ *lb.*

This drawbar pull is equal to the tractive power of the locomotive, less the sum of the gravity and friction pulls of the locomotive. Calling the weight of the locomotive w, the tractive power is $0.16\,w$; the gravity pull of the locomotive is $0.03492\,w$ and the friction pull $0.025\,w$. The drawbar pull, calculated from the weight of the locomotive w, is then $0.16\,w - (0.03492 + 0.025)\,w =$ say $0.1\,w$. Equating this value of the drawbar pull with that calculated from the weight of the loaded trip,

$$0.1\,w = 1438;$$

and

$$w = \frac{1438}{0.1} = 14{,}380\ lb.$$

which is the required weight of the locomotive.

Ques.—What weight of rails (20 lb. per yd.), ties, 18 in. apart, splice-bars; bolts and nuts are required for laying one mile of road?

Ans.—One mile of road, assuming a single track, requires 2 × 5280 ÷ 3 = 3520 yd. of rail; and the weight of iron for this track is, therefore, 3520 × 20 ÷ 2000 = 35.2 tons. The number of ties is 5280 × 12 ÷ 18 = 3520. The number of splice-bars will depend upon the length of rails used. For 30-ft. rails, there are 2 × 5280 ÷ 30 = 352 joints, which will require the same number of pairs of splice-bars, and 4 × 352 = 1408 bolts and nuts, allowing four to each joint. There will be required, besides, four spikes to every tie, making 4 × 3520 = 14,080 spikes, or, say 27 kegs of $4\frac{1}{2} \times \frac{7}{16}$-in. spikes.

Ques.—What would be your method of timbering rooms 30 ft. wide, with 10 in. of good slate roof over the coal and a massive sandrock above the slate? How many rows of props would you use, and how far from the face should the first row be placed? The coal is cut by mining machines.

Ans.—The depth of the cover and thickness of the coal not being given, it may be stated, in general, that the posts should be set in rows parallel to the face and staggered. The distance of the posts apart will depend on the depth of cover, thickness of coal, the width of room pillars and the character of the floor. Under the conditions stated, there being a good roof slate, 10 in. thick, if the floor is reasonably good, the first row of posts should be set 6 ft. from the face, and 3 or possibly 4 rows of posts will be required to properly control the weight on the coal face, owing to the massive sandrock above the slate.

Ques.—How should props be placed if the top is broken and the bottom solid?

Ans.—Much will depend on the character of the broken roof. If the roof is an interlocking slate, a systematic system of timbering will generally prove the best; but if the breaks occur in such manner as to render the roof treacherous, it will generally be necessary to place the timbers where they are most needed; but, in this case, a close watch must be kept of the roof by a competent, experienced person, to insure safety.

Ques.—Find the diameter of a shaft 90 ft. deep, from which 261 cu.yd. of material have been excavated.

Ans.—First reduce the cubic yards to cubic feet; thus, 261 × 27 = 7047 cu.ft. Then find the sectional area, by dividing the cubical contents by the depth of the shaft; thus, 7047 ÷ 90 = 78.3 sq.ft.

The diameter corresponding to this sectional area is then calculated by the formula

$$d = \sqrt{\frac{a}{0.7854}} = \sqrt{\frac{78.3}{0.7854}} = say\ 10\ ft.$$

COAL AND COKE NEWS

Washington, D. C.

On Sept. 3, the Attorney General of the Uuited States made public the fact that it was intended by the government to attack the so called anthracite-coal monopoly through the Reading R.R., and its affiliated concerns. This was followed by developments of a similar kind later in the week which showed conclusively the existence of an intent to press on along the same lines.

The plan of the government as now understood is to make a general assault on the anthracite-coal combination and to take up one by one the different elements in the trust so called, applying if possible a uniform type of method to the dissolution of the several elements, or if that prove impossible varying and adapting the methods as circumstances seem to demand. The suit against the Reading and a similar proceeding undertaken later against the Lackawanna, are, however, all that are apparently planned at present. It appears to be the disposition to wait and see how the methods employed in these suits seem to work and how the courts regard the propositions put before them by those who are engineering the cases in question.

An interesting feature of the Reading suit is seen in the fact that it includes an onslaught upon the road because of its alleged violation of the commodities clause of the Interstate Commerce Act. It has always been alleged that because of its being organized in a threefold way the Reading was immune from the prosecutions under the commodities clause of the act, but this view is doubted by the Attorney General. He takes the ground that the transportation by the Reading of coal produced by the P. & R. Coal & Iron Co. and transportation by the Central R.R. of New Jersey of coal produced and owned by the Lehigh & Wilkes-Barre Coal Co. violates the provision referred to and asks that such transportation be enjoined.

Other Suits Are Expected

Action taken by the Attorney General of the United States during the past week indicates a disposition to press further in the attempt to secure definite action in the prosecution of the Lackawanna Coal Co. and the Lackawanna R.R. Application is to be made to the federal court in New Jersey for the appointment of a master to take testimony in the case. It is understood that the counsel for the defendants will assent to this application and two assistant attorney generals have been assigned to the work of preparing and carying forward the government's side of the proceedings.

The Lackawanna case is similar to the Reading proceeding. In the latter there are two distinct phases. An attack is made under the legislation on the statute books against combinations in restraint of trade and one is made under the commodities clause of the Interstate Commerce Act. The petition asks in that case, as already noted, that the court ask the Reading company to dispose of the stocks it holds in the Philadelphia & Reading Ry. Co. and the Philadelphia & Reading Coal & Iron Co. The same plan will be followed regarding the Lackawanna.

HARRISBURG, PENN.

The letter sent out by the operators' press bureau deploring the attitude of the miners in refusing to work on holidays thereby restricting the output is resented by the coal diggers who assert that the companies do not follow the rule which they would have observed, closing down the collieries when they see fit without consulting the miners.

That the antnracite mine workers of northeastern Pennsylvania are satisfied with a certain annual income, that increase in pay means less work per man, is the conclusion to which operators have been forced by the present apathy of labor in that region. The public squares are constantly filled with mine workers who are taking a day off and it is confidently predicted that their annual average earnings for 1912 will not exceed those for 1911 in spite of the 10 per cent. increase granted last year.

In addition to their numerous holidays an approximate list of which is here printed, they seize upon the slightest pretext for staying away from work and sporadic "button strikes" abound. The holidays, some of which affect only a part of labor, but many of which close down every mine in the region, are as follows:

New Year's Day, Feast of the Epiphany, Greek Christmas, Greek New Years, Candlemas Day, Lincoln's Birthday, Ash Wednesday, Washington's Birthday, St. Patrick's Day, Annunciation Day, Anniversary of the Eight-Hour Day, Maundy Thursday, the day preceding Good Friday; Good Friday, Holy Saturday, Easter Monday, Odd Fellows Day, Ascension Day, Whit Monday, Memorial Day, Corpus Christi Day, St. Peter and St. Paul's Day, Independence Day, Feast of the Assumption, Labor Day, Feast of the Nativity of the Virgin Mary Columbus Day, Mitchell Day, All Saints Day, All Souls Day, Election Day, Thanksgiving Day, Feast of the Immaculate Conception and Christmas.

In 1911, which holds the high record for anthracite output and working days the mines worked 234 colliery days. This means that the mines were idle 47 days on account of strikes, accidents to machinery in the breakers or disinclination on the part of the miners to work and 84 days on account Sundays and holidays.

The same conditions as described above exist in the bituminous region, and men are also scarce. While there is plenty of work, the men seem to drift from one place to another, not because conditions are any better, but they seem to want the change.

PENNSYLVANIA

Anthracite

Girardville—On Sept. 4, a dynamite explosion in colliery No. 5, of the Lehigh Valley Coal Co., ignited gas which in turn set fire to the workings. In the opinion of some of the firebosses the mine will have to be flooded to cope with the fire. Half a dozen men were overcome by gas and fumes, but were revived and are out of danger.

Wilkes-Barre—Through its attorneys, the Delaware, Lackawanna & Western Railroad Co., on Sept. 2, commenced an attack on the assessment rate of $250 per foot-acre on coal land in this county. The company petitioned court for an injunction to have declared null and void the action of the county assessors in fixing a blanket rate on coal land.

Twelve hundred mine workers, employed at the South Wilkes-Barre colliery of the Lehigh & Wilkes-Barre Co., went on strike Sept. 3, on account of the refusal of 15 men to join the union and wear the button which indicates payment of dues.

Scranton—Because they objected to working with two men, who had not paid their dues in the miners' union, about 300 employees of the central colliery of the Lackawanna Coal Co. went on strike recently. The employees at Sloan shaft, which is a part of the working, remained at their places.

Summit Hill—The Lehigh Coal & Navigation Co. has donated to the borough of Summit Hill, a tract of land adjoining it to be used as a public park, upon which will be erected a soldiers' monument.

Bituminous

Grove City—After a strenuous two months' campaign, conducted by the officers of the United Mine Workers, every mine in the Mercer-Butler district is reported organized. This is the first organization of any account that the Mine Workers have attempted in this field since 1908, when their union was destroyed through the disastrous strike of that year.

Pittsburgh—Those concerned in the deal between the city of Pittsburgh, the Board of Education and the Federal Government, for the transfer of the Magee site, near Schenley Park, to the Bureau of Mines, in exchange for a portion of Arsenal Park, believe that the last obstacle to the prompt consummation of the exchange has been removed, and it is thought that the transfer will be made within a short time.

WEST VIRGINIA

Grafton—A movement has been started in this section, which has as its object the reporting of all coal mined in small quantities for local consumption from what are commonly called "coal banks." It is estimated that the output of these small mines aggregates something like 100,000 tons in a year, which would mean no small increase to the reported production of the state.

Charleston—Twelve West Virginia coal operators, representing the greater part of the coal tonnage on Paint and Cabin Creeks, accompanied by counsel, left Charleston on a special car, Sept. 2, for Washington, in order to be present when the sub-committee of the Senate resumed the investigation into the conditions which existed in the Kanawha

district, and the causes which impelled Governor Glascock to proclaim martial law in that territory.

ALABAMA

Birmingham—The Banner mine of the Pratt Consolidated Coal Co. has just been inspected by the mine department of Alabama in regard to its sanitary condition, and the report is exceedingly complimentary to the management, it being in an excellent condition.

KENTUCKY

Whitesburg—The condemnation proceedings recently brought at Whitesburg, Ky., by the Consolidation Coal Co. against John H. Bentley, in order to acquire an acre of ground owned by the latter in the heart of the industrial town of Jenkins, Ky., resulted in a finding by the jury of $43,000 damages for Bentley, the company getting the property for railroad purposes. Bentley had refused smaller sums than this for the property, holding out for $100,000.

Middlesboro—M. R. James, of Charleston, W. Va., has been at Middlesboro, Ky., recently, making investigations form that point of the entire Middlesboro field, in order to determine the power requirements of the various mines in that section, with a view to locating near Pineville or Middlesboro a power plant with sufficient capacity to furnish current to the mines in that section. Mr. James is said to represent Eastern capitalists.

Jenkins—Beginning with Sept. 2 the post office at Jenkins, Ky., was made a postal depository, the number of miners employed in the vicinity of the town making it certain that a large amount would be placed with the postal savings bank. On the same date the office was moved into larger and more convenient quarters.

OHIO

Columbus—A movement is on foot among the coal operators of Ohio for the formation of a strong organization comprising all of the mining districts of the state. This move is brought about by the fact that the operators must put up a strong fight against the miners union in its efforts to secure the passage of the anti screen bill. Operators in Ohio have not been able to form a strong state organization and as a result they have lost out in their fights with the miners union. It is believed that a meeting of operators will be called at Columbus sometime early in the year or even sooner.

Raymond—Three men were killed and three others seriously injured, Sept. 2, in a cave-in at the Portland mine of the Portland Coal Co., north of Wheeling, on the Ohio side of the river.

Rush Run—Pending an agreement between the operators and the mine-workers' officials, the Rush Run coal miners, who have been on strike for a week, returned to work, Sept. 6. The resumption is the result of a conference between C. J. Albasin, of the Ohio sub-district mine workers, and the operators.

INDIANA

Greenfield—A new trial has been granted in the case of Walter E. Krieble against the United Fourth Vein Coal Co. The case is of interest to coal mining companies because it involves the question of whether a coal company must supply props for the miners' use. A jury in a former trial awarded the plaintiff $12,000 damages for injuries received in a mine accident.

Terre Haute—Warren Soules, owner of 160 acres in Lost Creek township, Vigo County, has sold the coal and mineral rights to the Glen Ayr Coal Co., operated by Job, William and Clarence Freeman of this city, the last-named as manager. The consideration was $20,000. While the price looks high, several thousand acres in Fayette township were transferred sometime ago to Chicago capitalists at a higher figure, especially in the vicinity of the mines operated by the W. W. Ray interests of this city. Six hundred acres were purchased outright at $140 an acre and sixty acres at $300 an acre. The coal underlying the Soules land is said to be the best No. 4.

Sullivan—The Consolidated Indiana Coal Co. has brought suit in the circuit court against the Treat & Rowland Oil Co. to enjoin it from drilling through coal until proper arrangements have been made to take care of gas from the oil well. The complaint alleges that if gas is struck it would endanger the lives of the miners at work and might blow up the mine. It is alleged that although the hole drilled might not pass through an entry, at some future time an entry might be made and the gas well encountered. The suit raises an interesting question.

ILLINOIS

Harrisburg—The first cars were run, in the past week, over the new Southern Illinois Railway and Power Co.'s electric road between here and Eldorado. The road will also extend to Carrier Mills, eight miles south, and this will open up the entire mining field in this section to electric service. It is expected the line will be continued from Carrier Mills through the eastern Williamson County field, touching at Crab Orchard and Pittsburgh, with a terminus at Marion.

Springfield—The Illinois Mine Workers, through the Executive Board, have advanced the sum of $170,000 out of their $1,000,000 treasury fund to aid striking miners in other fields. One hundred thousand dollars goes to the Western Federation of Miners to aid strikers in the copper mines in Michigan, and the $70,000 goes to organization work in the disturbed fields in Colorado and other western states.

Two homes have been ruined and three others badly damaged, near Walden St. and North Grand Ave. during the past few weeks by a slow sinking of the land in that vicinity. This is believed to have been caused by a fall of ground in the south entry of the Peabody mine, which is directly behind these houses.

MICHIGAN

Kerby—Judge Jefferies, of Detroit, has been busying himself with the financing of a proposed coal mine, the shaft of which, it is said, will be sunk on what is known as the Clay Pit farm, near Kerby. It is understood that the leases held on a large area of land in the vicinity of the town will expire this fall, so preparations for mining, will have to be rushed. It is also reported, but without confirmation, that the promoters of the mine plan to produce 100 tons of coal per day, to be used in the operation of the cement plant at Fenton.

ARKANSAS

Fort Smith—It is reported in this vicinity that the coal industry in this field is in the finest condition that it has ever been. Mines are running full time, the only shutdowns being those that are necessary for the making of repairs. All companies have a large number of orders ahead and the relation between the men and operators is more harmonious than ever. It is also stated that the water conditions at Jenny Lind are being improved and the company is endeavoring to comply with the orders of the state mine commissioner as rapidly as possible.

OKLAHOMA

Oklahoma City—Citizens of Oklahoma City have taken definite steps to tap the oil and gas deposits believed to lie beneath the surface of Oklahoma County. A contract has been let for the drilling of a 3000-ft. well near this city, and the actual work will be begun at an early date.

FOREIGN NEWS

Shantung, China—The Shantung Mining Co., a Chinese concern, in 1912 produced 374,604 tons of coal at its Hungchan mine and 199,072 tons at its Sangtse mine, as compared with 288,752 and 170,405 tons, respectively, in 1911.

PERSONALS

David Shertzer has resigned his position as manager of the Conrad Brick Co. to accept the position of general manager of the Hamilton-Parker Fuel Co., a retail coal concern of Columbus, Ohio.

Isham Randolph has removed his offices to suite 1807, Commercial National Bank Bldg., northwest corner of Adams and Clark Sts., Chicago, where he will continue his practice as consulting engineer.

C. H. Hoyt, who represented the New York Coal Co., of Columbus, Ohio, in western Michigan territory has resigned to enter the retail business in Toledo. He has been succeeded by Harry Schweinsberger, an employee in the office of the New York Coal Co.

Colin M. Selph, whose appointment as postmaster for St. Louis was recently sent to the Senate, is president of the Anthracite Coalette Co. For several months past the company has not been operated, but it is likely that work will be resumed the coming winter.

C. M. Means has commenced his investigation into mining conditions in the neighborhood of Scranton for the state department of mines. His particular work will deal with the electrical equipment in the mines, with a view to suggesting possible safeguards to the chief of the state department of mines. If the investigation by Mr. Means in Lackawanna County shows that the electrical equipment in the mines is not up to the standard, his investigation will be enlarged so as to include the entire anthracite field.

TRADE CATALOGS

The Jeffrey Mfg. Co., Columbus, Ohio, Bulletin No. 118. "The Care and Operation of Jeffrey 28A Short-Wall Mining Machine." Twenty-four pages, 6x9-in.; illustrated.

The Buckeye Engine Co., Salem, O., The Buckeyemobile, Bulletin No. 10C. Fifteen pages 8x10, illustrating and describing the Buckeyemobile or American Locomobile.

The Draeger Oxygen Apparatus Co., Pittsburgh, Penn. "Oxygen, the Life Saver." Two hundred and twelve pages, 6x9-in., illustrating and describing various Draeger apparatus.

Henry R. Worthington, 115 Broadway, New York. "Conservation and Distribution of Water for Irrigation." Seventy-seven pages, 6x9-in., descriptive of irrigation and irrigating pumps; illustrated with many halftones and line drawings.

RECENT COAL AND COKE PATENTS

Boiler. G. J. Schanz, Erie, Penn. 1,069,583, Aug. 5, 1913. Filed Nov. 21, 1912. Serial No. 732,668.

Boiler R. Rohan, St. Louis, Mo. 1,069,184, Aug. 5, 1913. Filed Feb. 10, 1911. Serial No. 607,842.

Mine Spider. B. Madera, Brownsville, Penn. 1,069,798, Aug. 12, 1913. Filed June 17, 1912. Serial No. 704,214.

Smoke Consumer—I. Therrien, Quebec, Can., 1,061,143, May 6, 1913. Filed June 15, 1912. Serial No. 703,818.

Mining Implement. W. O. Snelling, Pittsburgh, Penn. 1,071,270, Aug. 26, 1913. Filed Nov. 23, 1908. Serial No. 464,156.

Smoke Consumer—C. A. Rush, La Grange, Ill., 1,061,502, May 13, 1913. Filed Jan. 18, 1910. Serial No. 538,601.

Smoke Consumer. T. E. Lappage, Birmingham, Ala. 1,069,270, Aug. 5, 1913. Filed Apr. 22, 1913. Serial No. 762,817.

Miner's Lamp. C. G. Sallander, Galveston, Texas. 1,068,533, July 29, 1913. Filed Nov. 1, 1911. Serial No. 658,016.

Coal Loading Machine—A. Powell, Uniontown, Penn., 1,061,775, May 13, 1913. Filed May 25, 1912. Serial No. 699,810.

Boiler and Economizer—P. W. Britts, Arleta, Ohio, 1,061,444, May 13, 1913. Filed June 11, 1908. Serial No. 438,001.

Coal Hopper for Windows—W. H. Taylor, Kewanee, Ill., 1,061,427, May 13, 1913. Filed May 24, 1912. Serial No. 699,532.

Miners' Acetylene Lamp—J. Courtney, Forbes Road, Penn.; 1,063,410. June 3, 1913. Filed Jan. 30, 1913. Serial No. 745,167.

Steam Superheaters—J. P. Parker, Philadelphia, Penn.; 1,063,585. June 3, 1913. Filed No. 28, 1908. Serial No. 464,931.

Smoke Consumer. P. F. Schaller and C. Cundt, Paris, France, 1,070,185, Aug. 12, 1913. Filed Sept. 18, 1911. Serial No. 650,006.

Coal Cleaning and Separating Machine. W. S. Ayres, Hazleton, Penn. 1,069,517, Aug. 5, 1913. Filed Feb. 24, 1909. Serial No. 47,699.

Miners' Lamp—S. N. Krieger and C. A. Fidler, Shamokin, Penn., 1,061,385, May 13, 1913. Filed Apr. 13, 1912. Serial No. 690,546.

Improvements in or Connected with Coke Ovens. N. Schuster, St. Stevens House, Westminster, London, S. W. 11,938 of 1913.

Apparatus for Making Coke and Gas. W. M. Carr, Wheeling, W. Va. 1,070,666, Aug. 19, 1913. Filed Dec. 11, 1911. Serial No. 664,950.

Smoke-Consuming Device for Furnaces. C. W. Lupe, Bradford, Eng. 1,070,148, Aug. 12, 1913. Filed Dec. 10, 1912. Serial No. 536,005.

Machine for Washing or Separating Coal. R. S. Benson, Middleton, Eng. 1,069,223, Aug. 5, 1913. Filed June 3, 1912. Serial No. 701,227.

Gas Producer for Generating Rich Gases. R. Lahanssois, Paris, France. 1,068,788, July 29, 1913. Filed Feb. 8, 1912. Serial No. 676,430.

Method of Operating Gas Producers H. L. Doherty, New York, N. Y. 1,069,866, Aug. 12, 1913. Filed Jan. 17, 1911. Serial No. 603,082.

Charging Apparatus for Blast Furnaces—T Lewis, Glengarnock, Scotland, 1,061,349, May 13, 1913. Filed Dec. 23, 1909. Serial No. 534,558.

Safety Appliance for Mine Car Cages—G. E. Huttelmaier, Scottdale, Penn., 1,061,747, May 13, 1913. Filed Feb. 24, 1912. Serial No. 679,581.

Downcemer Construction for Blast Furnaces. J. Kennedy, Pittsburgh, Penn.; 1,064,343. June 10, 1913. Filed Oct. 11, 1911. Serial No. 654,083.

Water-Tube Boiler. J. E. Bell, assignor to Babcock & Wilcox Co., New York, N. Y. 1,070,391, Aug. 19, 1913. Filed Nov. 7, 1905. Serial No. 286,184.

Water-Tube Boiler. H. B. Bradford, assignor to Edgemoor Iron Co., Edgemoor, Del. 1,069,105, Aug. 5, 1913. Filed Sept. 10, 1912. Serial No. 719,515.

Smoke Tube Superheater—W. Schmidt and P. Thomsen, Cassel-Wilhelmshöle, Germany; 1,063,349. June 3, 1913. Filed Oct. 3, 1912. Serial No. 723,661.

Coal-Handling Apparatus. A. C. Johnston, assignor to J. M. Dodge Co., Naugatuck, Conn. 1,069,431, Aug. 5, 1913. Filed July 3, 1912. Serial No. 707,431.

Gas Producer System—G. Akerland assignor to Standard Gas Power Co. Atlanta, Ga., 1,060,807, May 6, 1913. Filed Feb. 21, 1912. Serial No. 675,001.

Improvements in Mounting for Percussive Coal Cutters and the Like. W. Mauss, Commercial Exchange Bldg., Johannesberg, Transvaal; 21,553 of 1912.

A Process for Freeing Slack Coal from Water. W. C. Simon, Essen-on-the-Ruhr, Germany; 1,063,296. June 3, 1913. Filed Aug. 6, 1912. Serial No. 713,621.

Mine Car Wheel—F. C. Hockensmith, assignor to Hockensmith Mine Car Co., Penn Station, Penn., 1,061,746, May 13, 1913. Filed Nov. 8, 1911. Serial No. 659,217.

Baffle System for Stirling Boilers. D. S. Jacobus, assignor to Babcock & Wilcox Co., Bayonne, N. J. 1,070,478, Aug. 19, 1913. Filed Jan. 2, 1913. Serial No. 739,721.

Means for Operating Gas Producers. H. E. Longwell, assignor to Colonial Trust Co., Trustee, Pittsburgh, Penn. 1,070,825, Aug. 19, 1913. Filed Dec. 23, 1909. Serial No. 534,615.

CONSTRUCTION NEWS

Sheboygan, Wis.—The C. Reiss Coal Co. will spend $100,000 in enlarging its No. 1 coal dock on St. Louis Bay and has awarded a contract to Wales-Campbell Co. to lengthen the dock 600 ft., widen it considerably and install a complete new equipment of hoists and similar apparatus electrically operated.

Charleston, W. Va.—The early development of 27,000 acres of coal lands recently leased to John Laing, former chief mine inspector and associates, is expected soon. Already the Island Creek branch of the Chesapeake & Ohio R.R. is being extended to the tract and an immense central power plant to furnish power to every operation on the lease, has been located. Work will be commenced immediately in opening 12 mines in the property, and coal will be shipped before the first of the year.

Paducah, Ky.—The West Kentucky Coal Co. has placed an order with the Sherrill-Russell Lumber Co., of Paducah, Ky., for lumber to build thirty coal barges, the total amount of timber required being 1,085,000 ft., or about 73 carloads. Douglas fir, long-leaf yellow pine and white oak will be comprised in the order. The barges will be built during the next few months, at the rate of ten a month, and it is hoped to have them completed in time for the movement of coal down the river for the winter market.

Chicago, Ill.—The Allen & Garcia Co. has been appointed constructing engineer in charge of the new mine of the

American Coal Mining Co. near Bicknell, Ind. It has also been appointed construction engineer to take charge of the new mine of the Shoal Creek Coal Co., near Hillsboro, Ill., which is to be completely electrified and will be designed to have a hoisting capacity in excess of any mine in the state. The Allen & Garcia Co. will have entire charge of these two mines, including the shaft sinking, underground development and all construction work.

Charleston, W. Va.—The Pocahontas Consolidated Collieries Co. is about to let the contract for the construction of a steel tipple at Lick Branch, seventeen miles west of Bluefield on the main line of the Norfolk & Western Ry. The tipple will have a capacity of 3000 tons in 10 hr., and is to replace a wooden one that has outlived its usefulness. It is intended to handle the product of the Lick Branch and Shamokin collieries. The cost will probably be in the vicinity of $65,000, and the tipple must be completed by Apr. 1, 1914.

Mobile, Ala.—Of interest to the Birmingham district is the recent organization of the Standard Steel Co., which will build a large modern plant for the manufacture of structural steel, shapes, etc., at Mobile, Ala. This company is going to expend $5,000,000 on this plant, $800,000 of which will be used for the building of a model town, to be called New Mobile, just out from Mobile. This town will be modeled after the industrial city of the United States Steel Corporation, Fairfield, Ala., near Birmingham, which is considered one of the most uptodate industrial cities in the country.

Dublin, Ala.—The Gas Light Coal & Coke Co., of Birmingham is developing 2000 acres of coal land at Dublin, Ala., on the Illinois Central R.R. in the northern part of the State. It will expend about $100,000 in improvements, including fifty new dwellings, large commissary, etc., modern tipple and washer. The coal will be mined with machines driven by compressed air, and about 175 men will be employed when the mine is fully developed. This mine will tap the hard Black Creek coal, one of the best in the South for all purposes, being especially suitable for gas making. This is the second mine to open up on the Illinois Central R.R., the other one being the Brilliant Coal Co., at Brilliant, Ala., only three and one-half miles from Dublin.

NEW INCORPORATIONS

McAlester, Okla.—The Gap Oil, Coal & Gas Co. has been organized at McAlester with a capital stock of $40,000. The incorporators are U. G. Crane, R. G. Chandler, of McAlester, and H. B. Rowdy, of Kiowa.

Indianapolis, Ind.—The Middle States Coal Corporation of New York, has certified to the Indiana secretary of state that $560,000 of its $2,000,000 capital stock is represented in Indiana, with headquarters in Indianapolis.

Chicago, Ill.—The Monarch Coal & Supply Co. has been organized with a capital stock of $10,000 to deal in coal, wood, coke and lumber. The incorporators are Frank J. Kolar, Guy Vanschock, and W. Arnold Amberg.

Middlesboro, Ky.—The J. T. Reed Coal Co. was organized recently at Middlesboro, Ky., with a capital stock of $5000, by James T. Reed, H. A. McCaney and R. E. Samuels. The company will conduct a small operation in the Middlesboro field.

Aberdeen, S. D.—The Haynes Coal Briquetting Co., of North Dakota has been organized with headquarters at Haynes, and business office in Chicago. The capital stock is $50,000 and the incorporators are R. D. Ruffin, H. G. Adams, W. P. J. Dinsmore, John W. May of Chicago, and James S. Sebree of Pierre.

Charleston, W. Va.—The Pocahontas Coal & Land Co. has been incorporated with an authorized capital stock of $50,000. This firm will have offices at Marlinton, Pocahontas County, and chief works in the Edray district of the same county. The incorporators are Hubert Echols, F. R. Hunter, S. L. Hogsett, J. W. Prie, and J. K. Marshall, all of Marlinton.

INDUSTRIAL NEWS

Castle Gate, Utah—The Castle Gate Coal Co. has recently placed an order with the Link-Belt Co. for a complete shaking screen and picking equipment, including a Link-Belt rotary tipple.

Cleveland, Ohio—The Cooke-Wilson Co., of Ohio, has removed its offices from 614 Columbia Bldg. to 1114 Williamson Bldg., Cleveland, Ohio, and will be at its new quarters on and after Sept. 8.

Ruffsdale, Penn.—The Link-Belt Co. has received a contract from the Winona Coal & Coke Co. of Ruffsdale, for a complete retarding conveyor and shaking screen equipment for their new tipple at Coffman, West Va.

Columbus, Ohio—The Jeffrey Mfg. Co. has recently sold the Delaware, Lackawanna & Western Railroad Co. twenty 7-ton and two 15-ton locomotives, together with some conveying machinery which will be used in the latter company's mines.

Johnstown, Penn.—The Operators Coal Co., of Johnstown, is securing title to a tract of 6000 acres of coal and 1000 acres of surface in East and West Wheatfield Townships. This is the tract of coal that the Pressed Steel Car Co. tried to purchase several years ago.

Chicago, Ill.—Due to its growth of business, the Allen & Garcia Co. has established an electrical department. This department will be in charge of W. F. Corl, who has had long experience in electrical power and mining work, in design, construction, maintenance and operation.

Salt Lake City, Utah—The Standard Coal Co. of Salt Lake City has placed a contract with the Link-Belt Co. for furnishing a complete shaking screen and conveying equipment, including a new type revolving dump and a re-screening equipment. The entire supporting structure will be of concrete.

Nashville, Tenn.—During 1912, the State of Tennessee produced 6,587,754 tons of coal, valued at the mines at $7,422,703. This exceeded the production of 1911 in both amount and value. During that year the state produced 6,466,224 tons, valued at $7,071,376. It is further believed that the 1913 production will exceed that of 1912.

Mansfield, Ohio—The Ohio Brass Co. is now manufacturing all-wire rail bonds, with pin-driven terminals. The new bonds embody the same features which have characterized the older type, that is, terminals and body made of the same strands, and the strands protected by thin copper sleeves at the point where they are welded together to form the terminal.

Pineville, Ky.—The Wilhoit coal properties in Harlan County have been taken over by N. J. Moss & Sons under the name of the Moss & Sons Coal Co., and will be under the management of Ray B. Moss. W. L. Moss is president, J. M. Moss is secretary and treasurer and Ray B. Moss general manager. The Wilhoit mine is one of the biggest and best properties in Harlan County.

San Francisco, Calif.—Judge Maurice T. Deeling, of the United States District Court, on Sept. 5, ordered a fine of $2000 imposed on the Western Fuel Co., and directed the imprisonment of D. C. Norcross, secretary of the company, for contempt because of the refusal to produce the company's books before the federal grand jury, which is investigating alleged customs weighing frauds.

Liverpool, Eng.—It is estimated that the quantity of coal consumed by vessels engaged in international commerce is about 55,000,000 tons per annum, valued at approximately $180,000,000. It is probable that the total price is even higher than this, for on a large proportion of the coal supplied at foreign coaling stations, immense freight charges have to be paid in view of their remote situation.

Dublin, Ireland—The situation brought about by the strike of transport workers in Dublin has been rendered more acute by a lockout in the coal trade. The merchants at a meeting decided that they would no longer employ men belonging to the Transport Workers' Union, which organization, they say, will not permit its members to deliver the coal of certain firms with which the union is at loggerheads.

New York, N. Y.—Ex-senator John C. Spooner, as counsel for the American Coal Products Co., Barrett Mfg. Co., and 23 other defendants in the government dissolution suit against the so called Coal Tar Trust, appeared before Judge George T. Holt, Sept. 4, and stated that his clients had, within the period prescribed, complied with the requirements of the decree of the Federal District Court made in the Sherman Law suit. The combination complained of is now considered to be legally dissolved.

Danville, Ill.—The fiscal year of 1912-13 was the most successful from the standpoint of accidents that has ever been experienced by the Dering Coal Co. in the Danville district. Despite the fact that the roof is the most treacherous in the state, and that the coal is shot off the solid, there has not been one fatal accident for the entire year. This company operates three mines in this district, the average number of men employed during the winter months being 1200, and during the summer, 900.

COAL TRADE REVIEWS

GENERAL REVIEW

Anthracite market slowly readjusting itself to the fall trade and at the moment rather inactive. Bituminous maintaining its strength in the face of some adverse developments. Car shortage becoming more general.

The hard-coal market is now experiencing the uncertainties incident to a transitional period between the summer dullness and winter activity. While generally inactive, the first indications of improvement are beginning to appear. Prices on the whole are being well maintained, with the exception of the individuals, who, of course, are always ready to meet adverse conditions with concessions on the regular company circular. The handling of the new Pennsylvania State tax on anthracite is also causing some interesting manipulation in the market. Production is still being restricted, and will probably continue so throughout the balance of the current month, but indications point to a heavy demand this fall, and buyers who do not obtain their supply are liable to find themselves in a critical position within the next 60 or 90 days.

The withdrawal of the railroads from the Eastern market is the principal feature in the bituminous situation. These roads have been unusually heavy buyers for several months, and in fact have formed the backbone of the abnormally strong trade prevailing in bituminous. The disappearance of this sustaining power has introduced an element of uncertainty into the situation.

While the market has by no means developed any important weakness, shippers are, nevertheless, more willing to contract for deferred delivery and the situation is not so clear as it has been recently. A few water cargoes of consignment coal shipped into New England have not been well received, and unless inclement weather intervenes, the trade will be decidedly easier. The past conservatism has left much free coal on the open market, and sellers are showing a noticeable disposition to look for business. However, there is still a good demand in the prompt market, and as the season advances this will naturally improve.

The situation in the Pittsburgh district is less strong than formerly, the complaint being that too much coal was kept free for use in the spot market; no actual weakness has developed at the moment, and prices are being well maintained, but the demand for free coal is scarce. However, with the production well covered by contracts the conditions are by no means serious. In Ohio the hot weather and the holidays have caused the market to become rather inactive. The car shortage is steadily becoming more serious, and the Lake shipping is being somewhat delayed. The domestic business is the chief feature in the local situation, while the demand for steam and railroad coal is also good, with some buying in the open market; the Lake movement is being curtailed by the lack of sufficient transportation.

The dumpings at the Hampton Roads piers have been only fair during the week, and are mostly for shipment into New England. There is still a heavy movement from the mines, and operators are pushing their men for all the possible tonnage they can get. The situation in the Southern market is still unchanged, and the demand continues good, with an active fall business anticipated; the car shortage is becoming more noticeable.

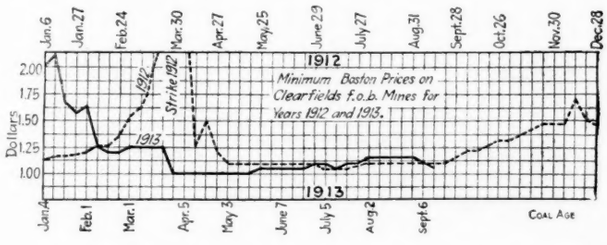
Conditions in the Middle Western market are bettering, with prices showing an advancing tendency. There is a lack of railroad equipment here, in addition to which some mines are experiencing trouble from other sources, such as insufficiency of water and numerous holidays.

BOSTON, MASS.

Pocahontas and New River remain firm, but with signs of an easier market later. Georges Creek in short supply with operators declining orders. More disposition on the part of Pennsylvania operators to seek future business. Anthracite strong.

Bituminous—The Hampton Roads coals remain firm, but the outlook for later in the fall is not so clear. Most of the shippers are offering at the contract figure for deferred delivery but they are still well supplied with spot business. There is increasing interest in the question whether stocks in this territory are piling up so fast that there will be a slackening demand within a few weeks. There are a few instances of cargoes shipped on the market which have not been well enough received to warrant much development along that line and it is being predicted that unless bad weather intervenes to slow up the movement the situation is likely to be decidedly easier. At the same time, prompt coal is hard to get and the advancing season, at least, is in favor of its continuing so.

Georges Creek for prompt loading is also hard to secure except on contract and more or less tonnage intended for Baltimore loading has been diverted to Hampton Roads where the dispatch is now about normal.



There is practically no news on the Pennsylvania grades. The operators seem still to have the situation well in hand although there is more disposition on the part of some to look now for late fall business. With so much conservatism in the attitude of the seller it is beginning to be wondered what is to become of the free coal that has been reserved for October and November. All-rail the movement is steady, with no material change either as to price or the volume of coal shipped.

Anthracite—The companies have ample business in hand for weeks to come and orders are still forthcoming for September coal. The prospect is excellent and the trade generally is in a wholesome condition. Individual coals are being offered at figures nearer the July than the September circular, but such cases are becoming rare and are not regarded as significant.

Quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.05@1.45	$1.35@1.60	$1.67@1.77	
Philadelphia*	2.30@2.70	2.60@2.85	2.92@3.02	
New York*	2.60@3.00	2.90@3.15	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Boston†				3.90@4.05
Providence†				3.83@3.93

NEW YORK

Anthracite uncertain but generally dull, with considerable coal still going into storage. The withdrawal of a number of railroads from market the feature in the bituminous situation. The effects are indeterminate as yet, but no weakness has developed at the moment.

Anthracite—Considerable uncertainty prevails in the local hard-coal market, some of the operators reporting that they are already unable to produce sufficient coal to supply all their orders. This condition, however, is probably due to the intermittent way in which the mines have been working, because of the restriction in output and the numerous holidays. Even those taking this optimistic view of the situation are free to concede that it is not due to any particular activity in the demand, but rather to the seeming impossibility of keeping production up to normal. There is a good supply of cars, but a decided shortage of labor.

Other producers are finding the market decidedly easier, if not dull. Much coal is being put into storage and the mines are only planning on working five days per week throughout the current month. Considerable pea is going into storage and chestnut is easy; stove coal is about the only grade on which there seems to be any insistent demand. However, the market is beginning to show some signs of activity, and all of the companies are anticipating a big business this fall and winter. Consumers who neglect to cover their requirements until late in the season, may find themselves in difficulties.

Prices remain practically unchanged with the exception of a small advance on chestnut and a somewhat stronger tone on barley. We quote New York hard-coal market on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	.....	$4.95	.....
Egg	5.25	$5.15@5.25	5.20	$5.00@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.40@5.50	5.45	5.35@5.45
Pea	3.50	3.35@3.50	3.45	3.30@3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.30@2.70
Rice	2.25	2.25	1.95@2.20	1.70@2.20
Barley	1.75	1.70	1.70	1.40@1.70

Bituminous—The feature of the soft-coal market during the week was the sudden and unexplainable withdrawing from the market by a number of railroads, notably the Boston & Maine, the Boston & Albany, the Grand Trunk and the New Haven. These companies have been active buyers for some time, frequently inquiring about the prospects for doubling their orders. As a matter of fact, they have been the predominating influence in the abnormally strong conditions prevailing in the bituminous market, and the unexpected withdrawal of their support has undoubtedly introduced a great deal of uncertainty into the situation. It is even generally believed that the pursuance of this policy will eventually place the market in a critical position. One large operator is of the opinion that the roads will not again be in the market for about 30 days.

Aside from a somewhat indefinite weakness in the low-grade coals, the market fails to show any indications whatever of a break as yet. It is a trifle spotty, particularly locally, but it is hardly conceivable that it can suffer any very important reverse because of the large amount of contract business signed up. There is not much free coal in the open market, nor is there much demand for it. While the mines seem to be producing all the tonnage required, it is doubtful if a very material increase could be made, should occasion demand, because of labor difficulties of various kinds in the mining regions. The local prices have not changed any, and the market is still quotable on the following basis:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.

PHILADELPHIA, PENN.

Rumors of a slight weakening in the strong bituminous market. Prices are occasionally being made at a concession due to heavy consignments in this direction. Some coals, however, are still hard to get at any price, and there is really no material setback from the favorable conditions that have prevailed.

The first faint indications of activity in the anthracite-coal trade have begun to make their appearance. Inquiries are becoming more frequent in both the wholesale and retail trade, and the orders are being received in more volume than has been the case during the last two months. While this change is not marked as yet, at the same time it is a healthy premonition of better things to come.

The inception of the winter is likely to find the trade in a position to meet almost any contingency. Nearly all the companies have large stocks of coal, of all sizes, and are reasonably sure that the conditions of last winter when a fuel famine stared some localities in the face, will not be repeated. This is dependent, however, upon the fact that conditions remain about normal; any unusual demand, or an exceedingly strenuous winter is not likely to be covered under this statement.

The month of October usually marks the period when activity in this branch of the trade sets in, and there is nothing to indicate at the present time that this year will prove the exception. Prices are well maintained, with the exception of the individual operators, who are making conditions to fit the case, and while these concessions, as a rule, are not much, the aggregate amounts to considerable and proves an acceptable inducement for buyers, not to mention the absorption of the state tax, which is only added under the tacit understanding that it will be deducted when settlement is made. The manipulation of this tax for business would make interesting reading, and has been the means of diverting many dealers from their regular sources of supply.

BALTIMORE, MD.

Demand excellent for this season but the market is showing the first signs of weakness. Cheaper fuels at tide. Low-grade coals and coke easier.

While it is admitted in many places that there are some signs of weakness in the market, these are the first to be noted for a number of weeks past and they are not important as yet. While there was no great accumulation of coal at tide here, reports from Norfolk, Philadelphia and New York are to the effect that considerable cheap coal is being offered at those points. The rush of fuel to tide and to terminal points generally is conceded to be having its effect.

Better grade coals are holding their own in excellent shape, but there are numerous reports of offerings of poorer fuels at prices considerably below what has been the rule for several weeks. No one is willing to admit that this marks the beginning of anything like a slump in the soft-coal market. All believe that the trade is so well covered with contracts on the higher-grade fuels that these are protected come what may, and that the natural demand for the other class of coal will be such as to prevent any decided drop in prices.

The growing uncertainty concerning coal cars on the railroads feeding this territory is also a feature in the situation. Already there are times in the Fairmont and Somerset districts when the lack of cars is being keenly felt. For the present, there is plenty of fuel to meet the demand.

Coke has also eased off, and some of the producers are now seeking a market. Offerings of West Virginia coals at from $2 to $2.40 were heard during the week, with Connellsville held at from $2.25 to $2.60. The very warm spell has slacked up the anthracite trade here. The first days of the month saw a number of deliveries for September account, but the rest of the month is likely to be slack. The orders already on the books, however, seem to give promise of a very busy October.

PITTSBURGH, PENN.

Mines working at substantially full capacity on contract business, with very little prompt demand. Some uncertainty at mines not contracted to full capacity, expecting to sell prompt coal. Connellsville coke price still maintained, though with some difficulty, and further curtailment in output expected.

Bituminous—Mines in the Pittsburgh district continue to work at substantially full capacity, with fair labor supply and practically adequate car supply. About all the coal mined is applied against contracts, there being very little disposed of on prompt sales. Demand for free coal is decidedly light, but offerings are equally light. The situation does not appear to be altogether as strong as formerly, it being claimed there is an element of weakness through so many operators having contracted for less than their full output, expecting to dispose of considerable tonnages in the prompt market, and it now seems improbable that any large demand will develop in this direction. Thus far no actual weakness has appeared. Regular prices are well maintained, and we continue to quote: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¾-in. steam, $1.50; 1¼-in. domestic, $1.55 per ton at mine, Pittsburgh district.

There is a tendency among Connellsville coke operators to market coal instead of coke, arising in part from a belief that there will be a good demand for coal and in part from a desire to curtail coke production in order to maintain prices. One interest having two small plants has already announced its intention of blowing out the ovens and shipping coal.

Connellsville Coke—Operators have had more trouble than for July and August in closing up for September such furnaces as were not covered for longer periods. There have been rumors that some coke went at concessions from the $2.50 price, but these cannot be confirmed as relating to first-grade coke. At any rate, the major portion of the tonnage required for September has been taken at the fall price, with two or three consumers not yet fully covered for the month. The New Jersey Zinc Co. is understood to have purchased 25,000 or 30,000 tons for delivery from September over the last four months of the year at $2.50, but guaranteed against decline. It is stated on the part of certain operators that they will further curtail production to meet the situation. We quote: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $3; contract foundry, $3 per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 30 at 403,030 tons, an increase of 33,554 tons, and shipments at 405,115 tons, an increase of 35,792 tons. This makes the tonnages larger than the average for July and August, which was about 380,000 tons weekly, while the average in the first half of the year was 409,000 tons weekly. It is hard to understand how production and shipments could have been so large lately, considering the material decrease in pig-iron production, but as to shipments in the week ended Aug. 30, it is to be remembered the holiday at the beginning of the following week was doubtless being provided for.

BUFFALO, N. Y.

Bituminous as hard to get as ever. Cars growing scarcer and flat cars unobtainable. Canada still very short of money. Railroads buying considerable soft coal. Anthracite dull.

Bituminous—There is no increase in the bituminous supply. It has been a long time since there has been a car of unsold coal in this market and there is no prospect of any right away. The consumption is brisk and the movement of cars not what it was. The indications are that consumers will soon be obliged to take anything in the shape of steel hoppers that they can get. Shippers with contracts for delivery in low-side, flat-bottomed equipment say that they are away behind because they cannot get the cars. If there is a falling off in consumption anywhere, it is in Canada, and that is entirely on account of the money scarcity. What ready cash was not absorbed in land speculation has now been sent to the Northwest to move the crops.

Some of the Pennsylvania mines are considerably hampered by lack of water, so that it would be impossible to increase the output to any great extent, even if miners were plentiful and all disposed to work. The railroads are also in the market and they probably would not buy any more now than they needed if they did not look for a shortage before long. The Buffalo market is quiet enough, as the distance from the mines is not great, but it is a hard matter to get shipments through such a terminal point as this and as the season advances the difficulty will increase. It will not answer to allow a consignment to take its natural course from the mine to the consignee if he is at all near the end of his supply. When the grain crops begin to move freely there will be a lack of motive power to add to the other difficulties.

The quotations of bituminous remain strong at $2.90 for select Pittsburgh lump, $2.80 for three-quarter, $2.65 for mine-run, and $2.15 for slack, which is especially strong.

Coke—There is some increased stiffness in the price of coke, said to be on account of shutting down of a good many of the ovens. Dealers now say that they cannot get the best Connellsville foundry short of $3 at the ovens, which would make the price $4.85 here without any profit to the jobber anywhere. Stock coke is as scarce as ever.

Anthracite—There is a return of warm weather that keeps the anthracite market dull, but people are now coming back from their vacations and they will go to buying as soon as the cool weather sets in. There is some special competition everywhere on account of some companies failing to make the addition to prices caused by the Pennsylvania tax; it is generally believed that the tax will never be collected.

Anthracite shipments by lake are not so heavy as formerly, on account of the congested condition of the upper-lake docks, but for the week were 148,000, for the month of August, 742,215 tons and for the season to September, 3,308,421 tons, as against 1,782,933 tons for the same time last season.

TOLEDO, OHIO

Hot weather and holiday cause the market to become inactive. Car shortage developing. Lake shipping somewhat delayed.

The coal trade has been rather inactive here during the past week, owing to the extremely warm weather. Labor Day following the Sunday holiday also made business dull. The demand for domestic coal has fallen off considerably but it is expected that as soon as the weather becomes cooler, business will open up briskly. There is considerable complaint among shippers of a car shortage but there has been little difficulty experienced here from this source as yet. Coal men generally, however, predict a shortage a little later when the crops begin to move more freely.

The city of Fremont, O., which suffered severely from the high waters of last March is already in the midst of a car famine and is anticipating an increase in the price of coal there this winter. Fremont is located on the Wheeling & Lake Erie railway, one of the largest coal carriers in the state and a congestion on this road is bound to affect Toledo. The lake shipping has been somewhat delayed owing to the short shipments but all the docks are working as hard as possible loading boats and getting their supplies off to the head of the lakes.

Prices quoted here continue as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.60	$2.50	$1.75	$2.50	$1.35	$1.35
Egg	2.25	1.20	2.50	1.50	2.50	....	....
Nut	1.80	1.20	2.25	1.50	2.50	....	....
¾ lump	....	1.35	....	....	....	1.20	1.20
Mine-run	1.50	1.10	....	....	....	1.10	1.10
Slack	....	0.70	....	....	....	0.80	....

COLUMBUS, OHIO

Activity prevails despite the intervention of a holiday and the growing car shortage; these two factors tended to decrease the production. Prices well maintained at the recent circular and no cutting of consequence is reported. The tone of the market is satisfactory and the outlook bright.

The chief feature of the trade has been the demand for domestic grades. Dealers in all sections are placing larger orders and are insisting upon prompt delivery. They have been busy delivering fuel to private consumers who are laying in their winter's supply somewhat earlier than usual. Retail prices are strong and inclined to advance; their stocks are not heavy and they are trying to increase them.

Steam business is also active and the demand for all steam grades is good. Railroads are taking a good tonnage as the freight movement continues high. Manufacturing concerns engaged in the iron and steel industry are good users of steam coal and other lines also show up well. A number of the steam users are buying their supply on the open market. Contracts are being renewed at higher figures than the previous year.

Lake trade is also good and the demand from the Northwest is strong. Chartering of boats is going on actively and the indications are bright for an active lake trade right up to the close of navigation. The Toledo docks of the Hocking Valley Railway company have handled almost two million tons during the present season.

Production has been curtailed during the past week by the shut down over Labor Day and also by a lack of transportation facilities. In the Eastern Ohio district the car shortage is probably the worst and as a result the output is estimated at 65 per cent. normal. In the domestic fields of Massillon and Jackson the output was larger. In the Pomeroy Bend district car shortage cut quite a figure and the production is estimated at 70 per cent. In the Hocking Valley district the supply of cars was better and the output is estimated at 80 per cent.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.75@1.70	.....	$1.85@1.75	$1.70@1.65
3-4 inch	1.60@1.55	$1.30@1.25	1.55@1.60	1.55@1.50
Nut	1.30@1.20	.....	1.35@1.40	1.25@1.20
Mine-run	1.40@1.35	1.20@1.15	1.30@1.25	1.25@1.20
Nut, pea and slack	0.80@0.75	.....	0.75@0.70	0.75@0.70
Coarse slack	0.70@0.65	0.80@0.75	0.65@0.60	0.65@0.60

HAMPTON ROADS

Movement of coal for the week only fair and mostly to the New England market. Sewalls Point makes record dumpings during month of August. Prices firm.

The movement of coal from tidewater has been fair, but it is doubtful if the dumpings will amount to anything like the quantity handled last week. The greater portion of the week's movement has been coastwise to the New England ports and has practically all been contract business. Foreign shipments were consigned to Cuban ports, Panama, and one large shipment to Italy.

Prices have been around $2.85@2.90, but it is difficult to say at exactly what figure any spot sales have been made as the suppliers seem to prefer to keep these private. There have been one or two small cargoes of high volatile coals moved to the New England market, but it is impossible to ascertain at what price it was sold.

During the month of August over one million tons of coal moved over the Hampton Roads piers, the exact tonnage amounting to 1,030,434 tons, of which Lamberts Point dumped 455,269, Sewalls Point making a record month with 283,385 tons and the C. & O. Ry. at Newport News dumped 291,780 or only about 8000 tons more than the one pier at Sewalls Point.

LOUISVILLE

Heavy shipments continue in spite of the warm weather. Strike possibility still the main uncertainty in the situation. Producers pushing the mines for all the tonnage possible.

The long continued summer weather is naturally having some effect upon the consumption of coal, but dealers are doing considerable storing in order to replenish their depleted supply, so that the movement from the mines continues heavy. This is true in both the Eastern and Western fields alike, a large part of the output in the former being used on contract shipments to points in the North and Northwest. Much of the Western Kentucky coal is going into Louisville for use both as a steam and domestic fuel. In event of the expected labor troubles in the Eastern Kentucky field coming to a head, their markets will have to be supplied from the Western district, and this at a time when the demand is the heaviest.

The higher grade fuels are still in the best demand in

spite of the discrepancy of about $1.50 in price. The only uncertainty in the situation now is the possibility of a strike in the Eastern Kentucky field. Some of those best informed on the situation claim that a lockout is practically unavoidable. Most of the mines are running on full time at the present moment, there being plenty of cars with orders in excess of the capacity of the mines. From the best information available the labor trouble will not be precipitated until Oct. 1.

In the meantime operators are taking full advantage of the abnormally strong market, and are pushing the mines for all the possible tonnage they can produce. In spite of the fact that there is a heavy movement of the prepared grades, the high-grade screenings are particularly scarce and difficult to buy. On the other hand, there is a surplus of the western Kentucky screenings. Domestic grades of eastern Kentucky remain at $2 to $2.25, with the better grades of nut and slack at 85c. Second grade and western Kentucky nut and slack are quoted at 60 to 65 cents.

BIRMINGHAM, ALA.

Little change in the coal and coke market. Car shortage still prevails. Pig iron firmer, with larger sales.

This past week has brought about very little change in the situation here. The demand for both steam and domestic coal is good, especially considering that this is the dull period, and it is expected that a good fall business will be done, at fair prices, both for lump and steam coals. The car shortage continues evident, and will, no doubt, be felt very much more as the winter draws nearer.

The demand for coke, both furnace and foundry, is only fair, as is also the case with smithing coal. Pig iron seems to be on a firmer basis, the large makers holding for their price and not accepting anything offered just to book the business. Some large sales were made this past week, and at better prices than have prevailed for several months. Altogether the iron market looks very hopeful.

INDIANAPOLIS, IND.

Market dull and quiet with mines working about half time. Screenings weak. Indications point to an active business in October.

As the weather so far in September has been as hot as it was in August, there is only slight improvement in the trade. Retailers who cater to the country trade say farmers will not haul coal over the dusty roads, with the thermometer showing 95 deg. in the shade. Most of the producers in the state are running better than half time, and the cooler weather that will come this month is expected to put the majority of the mines on full running schedule.

Screenings are cheap, according to the market, being quoted all the way from 10c. to 50c. Most operators, however, hold out for 50c. to 60c. Industrial conditions are reported up to the average for the season, though somewhat slack in spots. There seems to be as much complaint of a lack of labor as of labor out of work. No advance in prices was made Sept. 1, and, feeling that there is sure to be one on Oct. 1, domestic consumers are buying liberally and the yards will probably exceed the average September business.

CHICAGO

Conditions in the smokeless-coal market are not favorable and a decline in prices has been noted. Dealers also report a recession in anthracite. Screenings, as a rule, are selling at 45c., the mines.

Prices for smokeless coal have weakened slightly and while some of this product is selling at $1.50, shrewd buyers are not encountering much trouble in obtaining smokeless mine-run at $1.40 with lump and egg at $2.25, the mines.

The car situation in the territory which produces Eastern coal is less favorable and the same conditions prevail so far as Western mines are concerned. There has been a recession in the anthracite market and buyers are able to make purchases at from 25c. to 30c. a ton less than the circular price in certain sizes. A large amount of central Pennsylvania coal is being received in the Chicago market on the basis of $1.25 a ton, the mines, and is being disposed of as a substitute for West Virginia semi-bituminous coal. Furnace and foundry coke are moving chiefly on contract. Producers of splint coal report that they have comparatively little free coal for all-rail shipment westward.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.22@2.32	$2.70@2.80	$2.27	
Steam lump	1.92		2.07	
Egg		2.70@2.80		$4.30
Mine-run	1.82	2.30	1.87	$3.45@3.55
Screenings	1.22@1.32	1.55@1.65	1.22@1.32	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.75@4.85; gas house, $4.65@4.75.

DETROIT, MICH.

Stocks relatively light and market still strong. Slack in particularly good demand. Increase in prices anticipated soon.

Bituminous—The local market still continues very active; there is a good demand for all grades and the outlook is for a still further increase. Slack is coming in slowly and the demand is so heavy that the West Virginia grades are in some cases bringing as high as $1 per ton f.o.b. mines. Domestic orders are being received in good volume and dealers are busy making deliveries to their customers. Stocks on hand are relatively light and buyers are attempting to increase these as rapidly as possible to provide against the expected car shortage. Not much September business is being done, but it is expected that quotations for the month will show a slight advance before it is over. Manufacturers, who delayed closing contracts are very active buyers in the spot market. Some of these steam contracts are now being renewed at an advance over last year's figures, but producers, as a rule, are indifferent about signing up for any further tonnage, apparently preferring to keep some free coal for use in the open market.

The local market is now quotable on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.70	....	$1.75	....	....	$2.50	$2.40
Egg	1.70	....	1.75	....	....	2.50	2.40
Steam lump	1.25	....	....	....	....	....	....
¾-in. lump	1.15	$1.15	1.15	$1.15	$1.15	....	....
Mine-run	1.05	1.00	1.00	1.00	1.00	1.50	....
Slack	0.95	1.00	0.75	0.70	0.80	....	....

Anthracite—Hard coal has shown some slight improvement, but not of any great importance as yet. However, it is better than at any time since the cessation in activity last winter. Indications are that the middle of the month will see the beginning of the fall demand and it is probable that it will be an exceedingly active season for the companies.

ST. LOUIS, MO.

Market stronger, although the arrival of considerable speculative coal has caused some unsteadiness. However, mining is being interrupted and the movement is not heavy.

In a general way local conditions are improving. The market has gone up in the past week on standard coals, which is something that has been needed for some time. The Carterville and Franklin County market is not as steady as it might be on account of a large amount of coal coming in that was sold on speculation.

However, country prices are firm, which is accounted for by the car shortage, lack of water and the annual chain of county fairs that always take about two or three days a week of the miners' time. This will last for at least a couple of weeks longer, and as soon as the prevailing torrid spell is over and coal in demand, prices should continue to go higher.

The Standard operators have at last decided that they must get something for their coal, and Standard lump has gone up about 15c. per ton in the last ten days. Anthracite, coke and smokeless are still dragging, with no demand.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	.....	.....	.....	$1.15
3-in. lump	.....	.....	$1.50	.....
6-in. lump	$1.70 @ 1.85	.....	1.60	1.35
Lump and egg	1.50 @ 1.60	$2.15	1.60	.....
No. 1 nut	1.30 @ 1.40	.....	1.05	0.87½
Screenings	0.55	.....	0.40	0.85
Mine-run	1.50	.....	.....	.....
No. 1 washed nut	1.60	.....	1.60	.....
No. 2 washed nut	1.35	.....	1.50	.....
No. 3 washed nut	1.20	.....	.....	.....
No. 4 washed nut	1.00	.....	.....	.....
No. 5 washed nut	0.60	.....	.....	.....

OGDEN, UTAH

Operators able to increase number of working days by forcing the market, buying being done in limited quantities, surplus of nut and slack at the mines. Considerable coal being sold below circular.

The operators in Wyoming and Utah are making a desperate attempt to induce buyers to accept immediate shipments in order to keep the mines running full time. Orders are coming in slowly and salesmen are still working hard with the trade to induce them to get coal in transit before the car shortage becomes severe at the mines. The present condition is attributed to the money market. A large percentage of coal is bought with borrowed money, and for the past five months the dealer has been unable to procure money from his bank with which to buy. The demand for lump coal is better than during the last week in August, but this is due to the cool weather in various sections.

With the slight increase in the demand for lump and consequent increase in production at the mines, there is a surplus of nut and slack coal. This condition will probably continue through September or until the demand for lump is greater, at which time the mines will be able to move all the nut coal produced. About Sept. 20 the sugar factories will resume shipment, and this will take care of the slack.

Owing to the weak condition of the Market the operators have been unable to maintain the circular at all times, and in order to move the tonnage some shipments are being made at concessions. However, with the approaching cold weather this condition will be removed.

The car shortage has not caused the Wyoming mines to loose time, although there has been a shortage of closed equipment, and some commercial coal has been loaded in open cars. The Utah mines have not fared so well, the Rio Grande has been unable to furnish them sufficient cars, and the mines are now loosing from two to three days per week.

Present quotations are:

Lump	$2.75
Egg nut	2.50
Nut	2.25
Mine run	1.85
Slack	1.00

PORTLAND, ORE.

Wyoming and Utah mines give notice of 50c. advance to become effective Sept. 8. Local prices will probably increase accordingly.

Coal dealers here were notified this week that on Sept. 8 prices at the mines on Wyoming and Utah coals will advance 50c. per ton. At present the retail price here ranges from $9 to $10, and while no decision has been reached, it is taken as probable that retail prices will be advanced accordingly. No reason is given here for the increase.

So far no Australian coal has been imported here this summer, but if prices on Wyoming and Utah products continue to advance it is regarded as probable that some importations will be made in the fall, for which there is yet time. The freight market being easier than last year, it is the more likely that some of this business will be done this season. Last year freights were high and coal prices here lower than now.

It will be about a year before the Southern Pacific will have its line between Eugene and Coos Bay open for operation, but its completion will undoubtedly mark a change in the coal situation here and in many communities in the Willamette Valley, for the coal mines on the bay will then have found an easy outlet for their product.

NEW ORLEANS

Keen competition stimulates interest as period for new contracts approaches. Cars more plentiful than last week, but shortage still in evidence. Storing continuing on large scale.

While lacking activity in the spot market the number of contracts about to expire is stimulating interest in the local situation. Before the end of the year new agreements will have to be signed with a number of the principal steamship lines making this port and with most of the largest local consumers. Alabama interests hope to make further inroads on the old companies that rely on the river for their coal supplies. Indication of the keen competition between the Alabama, Kentucky and Pennsylvania coal companies was seen in the struggle last week for the school board contract for this year.

The car shortage is still a factor, but there has been some relief since last week, when the trouble threatened to become acute immediately. While the stocks of coal in the city are larger than ever before, there is no indication of curtailing the work of storing. The North German Lloyd Line is to make this port regularly and will add another important contract to those already pending this fall.

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY

Total shipments of coal over this road for July of the current year were 321,626 tons as compared with 245,087 tons for the same month last year. For the six months to July 31 of the current year, the shipments were 2,522,659 tons as compared with 1,908,004 tons for the same period the year before.

FOREIGN MARKETS

GREAT BRITAIN

Aug. 29—The coal market is quiet without any material change. Prices are firm for immediate loading, most of the collieries being well stemmed. There is little business passing for forward loading and prices have an easier tendency.

Best Welsh steam	$4.92@5.04	Best Monmouthshires	$4.14@4.26
Best seconds	4.68@4.80	Seconds	4.02@4.14
Seconds	4.44@4.56	Best Cardiff smalls	2.64@2.70
Best dry coals	4.44@4.68	Seconds	2.46@2.58

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while these for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

FOREIGN TRADE OPPORTUNITIES

The United States Counsellor Service reports opportunities in foreign coal markets as follows; complete details regarding different items can be obtained on application to the Bureau of Foreign and Domestic Commerce, Washington, D. C., by giving numbers.

Europe—A large European importer, supplying railroads and a navy with coal, is desirous of establishing a permanent connection with an American exporter of coal. The inquiry refers particularly to briquettes and they must be of sufficiently high grade to compete with the foreign product. Replies should quote prices, covering insurance and freight to port of destination. **No. 11,269.**

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Sept. 6:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	83	83	83	87	80
American Coal Products Pref	....	....	105	109¼	105
Colorado Fuel & Iron	33	31½	31½	41⅞	24½
Colorado Fuel & Iron Pref	....	....	155	155	150
Consolidation Coal of Maryland	102½	102½	102½	102½	102½
Lehigh Valley Coal Sales	210	195	200	....	....
Island Creek Coal Com	53½	52	53½	53½	47½
Island Creek Coal Pref	85	84½	85	85	80
Pittsburgh Coal	20⅜	19⅝	19⅝	24⅜	14½
Pittsburgh Coal Pref	85⅞	84⅞	85⅞	95	73
Pond Creek	22	20	21¼	23⅜	16½
Reading	163¾	160⅜	160½	168⅜	151⅜
Reading 1st Pref	84	84	84	92½	84
Reading 2nd Pref	....	....	88¼	95	84
Virginia Iron, Coal & Coke	39½	39½	39½	54	37½

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93½	98	95½	95½	93⅜	99½
Colo. F. & I. gen. 6s	103	106	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	83¾	Sale	83⅜	83⅜	77½	85
Cons. Ind. Coal Me. 1st 5s	76	78	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92½	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅜	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	85	85½	86½	June '13	86	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	77½	79	78½	Aug. '13	73	80½
Tenn. Coal gen. 5s	98½	99	99	99	98½	103
Birm. Div. 1st consol. 6s	101½	102	100⅜	Aug. '13	100⅜	103
Tenn. Div. 1st g 6s	100⅜	102	100½	July '13	100½	102
Cah. C. M. Co. 1st g 6s	..	103¼	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79½	80
Va. I. Coal & Coke 1st g 5s	92	92⅜	92	Aug. '13	92	98

No Important Dividends were announced during the week.

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The Colorado Fuel & Iron Co.—The Rockefeller interests are said to own one-third of the preferred stock of this company and about $20,000,000 of the total $33,000,000 of the Colorado Industrial Co. Under their management the company has shown a steady and consistent improvement, and indications are that the earnings for the current year will establish a new high record.

The Consolidation Coal Co.—During the year 1912 this company expended on improvements, betterments, extensions, enlargements and additions of a permanent nature only $329,773, as compared with $1,060,180 in 1911. However, they expended on Northern coal lands $1,261,127 last year, as compared with $146,521 in 1911. Profit and loss surplus in 1912 was $8,159,415, as compared with $7,039,192 the year before.

PRICES OF MINING SUPPLIES

MARKETS IN GENERAL

Price changes during the month have been unimportant, although the gradual advance in pig iron continued and renewed weakness has developed in finished-steel products. Metals have been very strong, with an excellent demand for copper forcing the price up to much higher levels. The severe drought in Missouri, Kansas and Oklahoma has been pretty thoroughly advertised, and while this will have a serious effect on the districts in these states, general agricultural conditions otherwise are fairly satisfactory. Returns are now available and show that the wheat crop will be a record-breaker, the corn crop about 800,000,000 bu. less than last year, but still a total crop of 2,300,000,000 bu. The cotton crop promises to be slightly less than last year.

The railroad situation is most unsatisfactory, and is having an effect on business throughout the country. Railway gross earnings are increasing rapidly, but net earnings show a decline, and it is evident that some of the important trunk lines of the country will have to reduce their dividends. This is not so important from the standpoint of the general wage earner as the fact that, with the reduction of dividends, comes the inability of railways to raise capital for new extensions and for improvements, something which gives employment to labor everywhere, and, moreover, the country has evidently caught up with its transportation facilities.

The production of pig iron during August showed a slight decline compared with July, and the advance in quotations indicates that all of this iron is rapidly being consumed. The country is now making pig iron within about 10% of its maximum capacity.

Financial conditions have steadily improved, and while it is by no means easy to secure long-time loans even when the security is desirable, still they can be secured, which was not the case three months ago. Conditions in this respect promise to improve with the season.

Unfilled orders of the U. S. Steel Corporation showed a smaller falling off than had been expected. The decrease was 175,888 tons, and the unfilled orders as of Aug. 1 aggregated 5,223,468 tons. The report of idle railway equipment was unfavorable, figuring as it did, an increase of 2881 idle care in the fortnight ending Sept. 1. In previous years, a decrease has always been recorded in the corresponding period.

LABOR

Disturbances in the ranks of labor have been less prevalent in the last four weeks than any time this year. Most disputes have been settled, and there seems to be little likelihood of any general outbreak before spring. In the meantime, the arbitration between the railway managers and the trainmen continues, and this is not likely to be settled for some time. From the West come complaints of shortage of labor in the harvest fields, and some of the railways operating in the States of New York and New Jersey had trouble in running their trains for a few days on account of the full crew law. This difficulty, however, will shortly disappear. Some improvement work on railways in the Northwest has been halted, owing to the inability to secure sufficient laborers to do the work. The strike of copper mines in the upper peninsula of Michigan continues and has been attended with much violence.

Ordinary outside labor commands $2 per day.

IRON AND STEEL PRODUCTS

The production of pig iron during August aggregated 2,545,000 tons, compared with 2,560,000 tons in July. The difference in amount is practically negligible, and as prices of pig iron advanced slightly during the month, it is evident that no stocks are being accumulated. This is a negatively favorable argument, as it was generally believed that the production of pig iron would show a much larger falling off. Price changes during the month have been unimportant, but pig iron has trended toward higher levels, while finished steel products have been easier, even if no change in prices has been made. The inability of the railways to purchase equipment and make improvements, is largely responsible for the dullness in the steel market, but other consumers are buying almost as freely as they have at any time. It will not be at all surprising if legislative enactment is made some time in the near future compelling railways to substitute steel equipment in its passenger service. This, in itself, will make for tremendous activity in the car-building line.

Pig Iron—Sales of pig iron were larger in August than in July, and several sales of importance were made in the Southern market at $11 for Southern foundry No. 2. This represents an advance of $1 per ton over the recent low quotation, and indicates that the pronounced weakness, which was evident in that market in June, has disappeared; for the time being at least. It is understood that the furnaces making these sales have booked enough orders to keep their stacks running until the first of the year. The fact that the production of pig iron in August was nearly as large as in the preceding month was in itself satisfactory, and the knowledge that the furnaces going out of blast in September would be succeeded by furnaces of larger capacity going into blast, leads to the belief that the production of iron during September will be as large as in August. Another reassuring factor was that several of the large consumers of pig iron, such as manufacturers of electrical supplies, railway equipment and cast iron pipe, who seem to have the faculty of buying when the market is lowest, placed their orders for large amounts which will last them for many months to come. This was taken as an indication that the market for the time being had touched bottom. Southern foundry iron No. 2 in Cincinnati is quoted at $14 to $14.50; No. 2 Northern foundry in Chicago is $15 to $15.50; bessemer iron in Pittsburgh is $16.65 to $16.75, which price includes the 90c. freight rate from the valley to Pittsburgh.

Steel Rails—The principal railroads of the country have not placed their orders for 1914, and it is common talk in the steel trade that, if the railroads would show their confidence in the situation by placing orders, it would result in a much better feeling in the steel trade. Some improvement is evident in the export situation. All of the mills manufacturing rolling rails have enough business on their books to keep them actively engaged for the next two months.

Quotations are unchanged at $28 per ton for standard sections of bessemer rails, and $30 per ton for openhearth rails, both f.o.b. Pittsburgh. These prices represent a quotation of 1.25c. per lb. for standard sections weighing from 50 to 100 lb. per yd.; 1.21c. for 40- to 50-lb. rails; 1.30c. for 16- to 20-lb. rails. In Chicago, 16- to 20-lb. rails are 1.30c.; 12-lb. rails, 1.33c. Relaying rails in Chicago can be had at $24 per gross ton and in New York at $22.50.

Track Supplies—No inquiries of importance have appeared in the market, but it is evident that the railways will not be able to postpone the placing of orders much longer, and it is probable that the amount required will be as large as in 1913. Quotations are easier, spikes in large lots to railways being obtainable at $1.75 to $1.80 Pittsburgh, but for small lots $1.90 to $1.95 is demanded. In Chicago, spikes are quoted at $1.90 to $2; track bolts with square nuts, $2.25 to $2.40, and angle bars $1. 50.

Structural Steel—Building work in the Central West has been fairly active, and some of the leading fabricators in Pittsburgh, Chicago and the Ohio district have a fair amount of work on their books. Quite a little new work has come out for power houses in various parts of the country, and a contract for a new 18-story office building to be erected in Detroit was recently let. A new lodge building in Pittsburgh will require about 3000 tons. Railway work is especially inactive, and few bridges are being contracted for at the present time. The principal work in the East is for new subways in New York City, and a recent contract calls for the placing of 6000 tons. The steel, when bought, is being erected rapidly, and consumers have little or no complaint regarding deliveries. Fabricated work is fully as cheap as last month, and it is unusually low. Structural steel shapes are quoted at 1.45@1.50c. Pittsburgh, and 1.63@1.68c. Chicago. These prices are per lb. in large lots.

Pipe—The market for pipe is spotty. The demand for line pipe, or pipe that is used by oil and gas companies, has been unusually heavy, and some of the principal manufacturers of this kind of pipe are unable to take any more orders for delivery this year. On the other hand, the demand for smaller sizes of pipe used in steam work and for general industrial

purposes, is not at all large. One of the largest inquiries in the market is for 20 miles of 8-in. pipe. There is some trouble over the puddling scale, and some of the workmen have not signed for the coming year. Quotations show no change since last month, but at that time there was a revision in discounts on ¾- to 2-in. pipe. Discounts and net prices are as follows:

	Black	Galvanized
¾- to 2-in. steel butt welded	80%	71½%
2½- to 6-in. steel lap welded	78%	69½%
7- to 12-in. steel lap welded	75%	64½%

At these discounts the net prices of pipe per foot at Pittsburgh are as follows:

	Cents			Cents	
	Black	Galvanized	Diameter	Black	Galvanized
¾-in.	2.30	3.26	5-in.	30.50	45.00
1-in.	3.40	4.83	6-in.	42.25	58.25
1¼-in.	4.60	6.60	7-in.	59.50	85.00
1½-in.	5.50	7.90	8-in.	62.50	89.00
2½-in.	12.90	17.80	10-in.	$1.03	$1.46
3-in.	16.80	23.30	11-in.	1.13	1.64
4-in.	23.00	33.20	12-in.	1.27	1.82

Sheets—New business is only fair, but some makers who were willing to accept orders on a basis of 2.15c. Pittsburgh for No. 28 black were able to secure enough tonnage to keep their mills running for some time. It is pointed out that the mills that are making this price are scarcely able to come out even, if they buy their sheet bars in the open market. The leading interest is now operating to about 70% of capacity, which is slightly better than last month One reason for the continued decline in sheets and the weakness in the market, is the fact that quite a little new capacity has sprung up in the last year, and competition is unusually keen. The following quotations are for small lots of a few bundles or more f.o.b. Pittsburgh and Chicago. The price for large lots is $1 per ton lower than last month, being quoted at $2.20 f.o.b. Pittsburgh for No. 28 black per 100 lb.

	Cents per pound			
	Pittsburgh		Chicago	
	Black	Galv.	Black	Galv.
Nos. 22 and 24	2.70	3.50	2.65	3.45
Nos. 25 and 26	2.75	3.65	2.70	3.60
No. 27	2.80	3.90	2.75	3.85
No. 28	2.85	3.95	2.80	3.90

WIRE PRODUCTS

Wire—The cut in prices made Aug. 1, brought business and some large orders were booked at the lower quotation. It is stated that the American Steel & Wire Co. booked orders for wire and wire products during August at the rate of 7000 tons per day. This will keep mills actively engaged for the remainder of the year, providing specifications follow in due course. Quotations are unchanged as follows: Annealed fence wire in large lots, $1.50; galvanized barbed wire, $2.15; annealed barbed wire, $1.75. These quotations are per 100 lb. f.o.b. Pittsburgh. In Chicago, plain wire is $1.73; painted barbed wire, $1.93 and galvanized, $2.33. These quotations are also for large lots.

Copper Wire—Announcement that considerable work would be done by the Norfolk & Western Ry. in the electrification of a mountain line, and indications that other railways will do similar work, was partially responsible for the sharp advance in copper. The market for wire is not especially active, but considerable business has been placed on a basis of 17½c. per lb., and quotations now are nearer 18c. than this lower figure. The trade continues extremely optimistic regarding the leading feature of business.

Telegraph Wire—For lots of fair size wire, measured in Birmingham wire gage, prices in cents per pound are as follows: "Extra best" No. 6 to 9, 4⅜c.; No. 10 and 11, 4½c.; No. 12, 4⅝c.; No. 14, 5⅜c.; "best best" No. 6 to 9, 3½c.; Nos. 10 and 11, 3⅝c.; No. 12, 3½c.; No. 14, 4c. Actual freight is allowed from Trenton, N. J., where it does not exceed 25c. per 100 lb.

METALS

Copper—Buoyant advances in copper throughout the month brought the price to 16¾c. per lb. This is an advance of 1c. per lb. in the last three weeks. Largely responsible for the advance were the continued heavy takings of copper by consumers in Europe and in the United States, and furthermore, the fact that the statistics would probably show a decrease in stocks. These were fully as favorable to the producers of the metal as anticipated, as the production of the United States was smaller than the previous month, being 131,000,000 lb., and the deliveries, both domestic and foreign, 146,000,000 lb. Stocks reported at the end of August were absolutely the smallest since the Association has been compiling statistics, being 38,000,000, lb. a decrease of 53,000,000 lb. in the four weeks. This was in spite of the fact that the exports of copper in the first eight months of the year were 2000 tons less than the corresponding time last year, and the imports were larger than last year by 3000 tons. The copper trade is highly optimistic, and many believe that prices will go to still higher levels, and perhaps 20c. may be quotel for copper before the turn is reached.

Tin—The market is higher and steadier than last month, and buying has been fair. Sales have been made as high as 43.50c. per lb., and the general quotation for small lots is around that figure.

Solder—Strictly half and half solder is about 1c. per lb. dearer, being quoted at 26 to 27c. per lb.

Lead—Continued scarcity of lead, due to the strike of the lead miners in Missouri, resulted in obtaining a price of around 5c. per lb.

HARDWARE

Nails—The cut in price made Aug. 1 stimulated business, and although nails can be had on the same basis as last month, it is felt that this quotation will not continue for any length of time. Wire nails are held at $1.75 in Pittsburgh, and $2.05 New York in kegs of 100 lb. in large lots. For small lots from jobbers' stores, $1.95 is quoted in Pittsburgh and $2.15 in Chicago.

Iron and Steel—Business continues especially active, and jobbers report that some sizes are broken. Prices from warehouse stocks in Pittsburgh and other distributing centers are as follows:

	Per lb.
Refined iron:	
1 to 1⅞ in., round and square	2.10c.
1½ to 4 in. x ⅜ to 1 in.	2.10c.
1½ to 4 in. x ¼ in. to ⅜ in.	2.30c.
Norway bars	3.60c.
Soft steel:	
¾ to 3 in., round and square	2.05c.
1 to 6 in. x ⅜ to 1 in.	2.05c.
1 to 6 in. x ¼ and ⅝ in.	2.20c.
Rods—⅝ and ⅞ in.	2.15c.
Bands—1½ to 6⅜ in. to No. 8	2.35c.
Beams and channels—3 to 15 in.	2.15c.

MISCELLANEOUS

Portland Cement—Business is large and steady. Some reports have been current that, with the completion of the work on the Panama Canal and the barge canal in New York State, there is likelihood of lower prices being named for cement, and a large amount of unsold cement being thrown on the market. This is scarcely probable, as the combined takings of these jobs have rarely exceeded 1,000,000 bbl. in any one year, and new uses are continually being found for cement, one of the largest being for concrete roads, and, should cement be used for this in general, it will be found that a very large amount of material will go into consumption in this line. Prices show no change. In Pittsburgh, the quotation is 90c. to $1; in Chicago, $1.25; Detroit, $1.34; St. Paul and Minneapolis, $1.45. These quotations are f.o.b. but do not include the cost of package. In general, consumers have to pay about 40c. per bbl. for the package, also the freight to destination. This amounts to $1.58 in New York and Pittsburgh.

Paints—The price of linseed oil has advanced slightly and is now quoted at 53 to 54c. per gal. in 5-bbl. lots. Spirits of turpentine is also higher, and is quoted at 41c. The higher prices of pig lead resulted in a revision of the quotation of white lead in oil, which is now quoted at 8c. per lb. in 100, 200- and 500-lb. kegs.

Bars, Concrete Reinforcing—Business is more active, but somewhat lower quotations have been made whenever a desirable order was in sight. Prices for small lots from Pittsburgh warehouse are as follows:

PITTSBURGH, CENTS PER POUND

	Warehouse Stock
¾-in.	1.95@2.05
⅝-in.	2.00@2.10
½-in.	2.05@2.15
⅜-in.	2.20@2.30

Brattice Cloth—Higher prices are probable despite some favorable concessions to consumers in the new tariff bill. The demand continues large, and private advices from abroad hint at the possibility of a strike at the mills. Consumers are buying in small lots but prices are more or less stationary.